

LITERATURE OF MANUFACTURERS

Catalogues, bulletins and other direct advertising material recently issued. Manufacturers are requested to send copies of new trade literature promptly to Electric Refrigeration News.

Acorn Opalite

Restaurant fountains, coolers, and display refrigerators are depicted in a folder issued by Acorn Opalite Metal Specialties Co., 1052-1504 W. Monroe St., Chicago. Four models of refrigerators and three types of fountains are shown. A leaflet describes "The Jiffy" a small model soda fountain 45 inches long and a glass display case.

Aerol

Oilburning melting kettles and a cork dipping pan are described in bulletin 68-A of the Aerol Burner Co., Inc., West New York, New Jersey. Leaflet No. 93 shows melting kettles on casters for easy moving, while leaflet No. 65 gives specifications of a cork dipping pan used for melting asphalt in cork insulation work. A water pan for heating buckets of wax or other compounds used as insulants is also shown.

Gibson

A catalog issued by Gibson Refrigerator Co., Greenville, Mich., contains refrigerator specifications and details for architects and builders. Twenty-four cabinets for self-contained, remote, or multiple installations are illustrated. These models have one-piece, seamless porcelain or baked porcelain interiors, and exteriors of porcelain or metal with white enamel finish.

Gurney

All steel refrigerator cabinets offered by Gurney Refrigerator Co., Fond du Lac, Wisconsin are described in a twelve page booklet. Storage capacities range from 5.8 cu. ft. to 8.2 cubic feet. These models are designed for self contained or multiple installations.

Heinig

Refrigerated truck bodies built by B. Heinig, Chicago, Ill., are illustrated in a large broadside which has been received. One model shown is electrically refrigerated, while another is designed for use with Dry Ice (solid carbon dioxide).

Juruick

Ten types of ammonia refrigerating units in the Juruick line ranging from 1/2 ton to 30 ton capacities are illustrated in a broadside issued by American Engineering Co., Philadelphia, Pa.

Kelvinator

Kelvinator Corp., Detroit, announces new additions to its line in two broadsides. One is devoted to the "Kelvinator Four" a small domestic model with 4.23 cu. ft. capacity and a shelf area of 8.87 sq. ft. The other, a large broadside, illustrates nine heavy duty compressors having motors ranging from 1-16 to 1 hp. Eight models of crossfin cooling coils and five models of deep fin cooling coils are also shown. Eleven water cooler models are also included. Two of the water coolers are designed for mill or industrial use, three for cafeterias, and the remaining eight of various sizes for office use. A series of four folders printed in colors are designed to appeal to the housewife with such ideas as safe food and economy.

Kentucky Bodies

A refrigerated truck body designed for meat packers is described in a catalogue issued by Kentucky Wagon Manufacturing Co., Louisville, Ky. Two inch Dry Zero insulation is used. This truck body is being mounted on the Ford AA chassis.

May Oil Burner

A 30 page book issued by the May Oil Burner Corp., Baltimore, Md., sets forth the manner of installation and operation

of the May automatic oil burner. A progressive series of illustrations in color depict a typical installation. Three pages of photographs show homes in England, Japan, and Canada in which May oil burners have been installed.

Rice

A broadside from the Rice Products Inc., 301-315 Beaubien St., Detroit, Mich., describes the self-contained refrigerating unit manufactured by them. Two cabinets, a 4 1/2 cubic foot model for apartments and a 6 cubic foot model for homes, are also included.

T & J

A broadside giving details of the T & J vari-speed constant voltage generator for powering electric refrigeration units in refrigerated truck bodies has been issued by Thompson & Jameson, Inc., Chicago, Ill. This generator is driven by the truck motor. An auxiliary motor makes it possible to keep the truck body refrigerated by power furnished from an ordinary lamp socket attachment when the truck motor is not running.

Thesco

Thesco ice freezing units manufactured by C. Schmidt Co., John and Livingston Streets, Cincinnati, Ohio, are described in a broadside. Two types of ice freezing units are illustrated, one being adapted to such refrigerants as sulphur dioxide, methyl chloride, and ethyl chloride, while the other is designed for use with circulation brine or ammonia. A large unit for freezing ice cubes is also shown.

REQUESTS FOR INFORMATION

Readers who can assist in furnishing correct answers to inquiries or who can supply additional information are invited to address Electric Refrigeration News, referring to the query number.

Seeks Agency For Soda Fountains

Query No. 257—A reader in Mexico writes, "I am interested in handling soda fountains and would like to obtain the names of various soda fountain manufacturers."

Note—The following concerns manufacture Soda fountains: the Acorn Opalite Metal Specialties Co., Inc., 1050 W. Monroe St., Chicago, Ill.; American Soda Fountain Co., Walnut St., Watertown, Boston, Mass.; Liquid Carbonic Corp., 3100 S. Kedzie St., Chicago, Ill.; Russ Mfg. Co., 5700 Walworth Ave., Cleveland, Ohio; and the Stanley Knight Co., 218 W. Superior St., Chicago, Ill.—Editor.

Capacity and Efficiency Tests

Query No. 258—A reader in Indiana asks, "Kindly give use the names and addresses of universities or engineering concerns that are capable of making capacity and efficiency tests on small refrigerating machines using methyl chloride as the refrigerant."

Note—The Electrical Testing Laboratories, 80th St. and East End Ave., New York, N. Y., is equipped to make capacity and efficiency tests of the types of small refrigerating machines in which you are interested.—Editor.

Dry-Ice

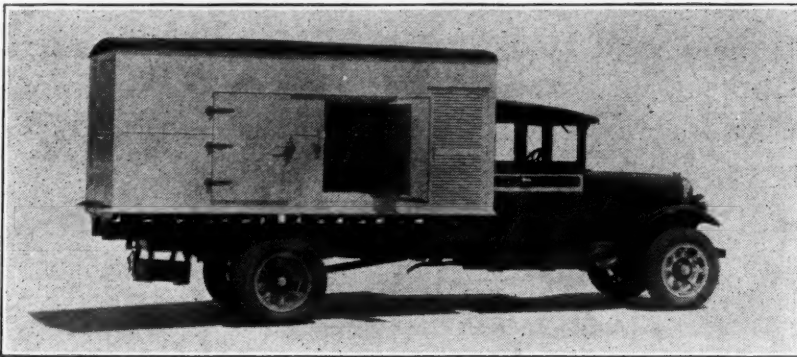
Query No. 259—A subscriber in Michigan states, "We are very much interested in the Dry-Ice Corp. of New York and do not know where it is located. Would you kindly give us this information?"

Note—The Dry-Ice Corp. of America is located at 50 East 42nd St., New York, N. Y.—Editor.

Compressors for Cooling Drinking Water

Query No. 260—A reader in Illinois writes, "Will you have various electric refrigerator manufacturers furnish me with quotations on compressors for cooling drinking water? Quotations should be in lots of ten, fifty and two hundred machines with capacities for cooling five, ten, twenty, fifty and one hundred gallons each per hour."

Truck Motor Supplies Power for Frigidaire Cooled Body



Mechanically refrigerated truck bodies manufactured by the Plymouth Body Works, Plymouth, Ind., are designed to meet the requirements of ice cream manufacturers, meat packers, florists, confectioners, and dealers in fruits and vegetables. The staggered post construction is used on all small sizes of bodies.

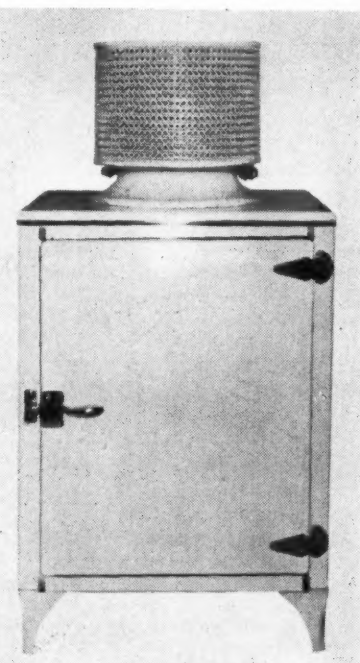
Dry-Zero insulation manufactured by the Dry-Zero Corp., Chicago, is used in all truck bodies. A Brown-Lipe power take-off constructed with roller bearings throughout is used. Under ordinary operating conditions this power take-off is in operation from six to eight hours per day. The power for the electric re-

frigeration unit is furnished by a T. & J. vari-speed constant voltage generator driven direct from the truck motor through the power take-off. This generator furnishes a steady flow of power regardless of the speed of the truck.

At night when the truck is parked in a garage an auxiliary motor which is connected by a cord to any power outlet. This auxiliary motor operates the refrigerating unit which enables the contents of the truck to be kept at any desired temperature. A Frigidaire unit is used which has ample capacity for the type of refrigeration required.

WILLIAMS INTRODUCES ICE-O-MATIC JUNIOR

The Ice-O-Matic Junior line was introduced at the recent fifth international convention of the Williams Oil-O-Matic Heating Corp., held at Bloomington, Ill. The cabinets in this line have approximately 4.5 cu. ft. of storage capacity.



One of the new Williams models with the unit on the top.

All mechanical parts, including the motor, are enclosed in a hermetically sealed housing. The entire assembly is protected by a perforated metal casing. Mounting may be on top of the cabinet, in the lower part of the cabinet or in the basement.

An oscillating pump is used with the Ice-O-Matic Junior models and the piston is driven directly from the motor shaft. The entire compressor mechanism is submerged in oil.

KELVINATOR ADDS FOUR CU. FT. DOMESTIC MODEL



The New Kelvinator Four

The small self-contained model shown above is the Kelvinator Four, a domestic unit, which has been recently added to the line of the Kelvinator Corp., Detroit. Including the defrosting tray, the interior dimensions of the cabinet are equal to 4.23 cu. ft., while the shelf area of 8.87 sq. ft. provides ample space for storage of food receptacles. This model has an interior of porcelain.

"PLEASE CHANGE MY ADDRESS"

Recent movements of subscribers as indicated by changes in mailing addresses.

Adams, H. B., from 401 E. Hanna, to 6702 Dixon, Tampa, Fla.

American Refrigerating Co., from John Butler, Chief Engineer, 755 E. Glisan St., to John Butler, Chief Engineer, 842 Sandy Blvd., Portland, Ore.

Ayres, A. H., from c/o Ideal Heating & Refrigeration, 829 S. 22nd St., to 1522 North 25th St., Birmingham, Ala.

Baker, E. H. Jr., from 971 E. 63rd St., to Koldstream Inc., 3901 Superior Ave., Cleveland, Ohio.

Baker, Lewis W., from 3005 Eads Ave., to 2718 Allen Ave., St. Louis, Mo.

Cheatham, H. A., from 1411 Magnolia Bldg., to 1801 N. Lamar St., Dallas, Texas.

Chiyodagumi, Ltd., from 810 Marunouchi Bldg., Tokyo, Japan to 804 Teikoku Seimei Kan, Marunouchi, Tokyo, Japan.

Connell, Ralph, from c/o Herman Litke, R. D. No. 1, Norristown, Pa. to 114 Linden St., West Chester, Pa.

Corcoran, J. A., from Kelvinator Sales Corp., 32-37 Queens Blvd., Long Island City, to 1 West 47th St., New York, N. Y.

Dominion Blower Co. Ltd., from 386 King St. W., Toronto, Ont., to Brantford, Ont., Canada.

Douglas Ray, from Norge Corp., 670 E. Woodbridge, Detroit, to 606 Park Ave., Royal Oak, Michigan.

Durnack, John E., from 42 Sickles St., New York City to 37-05 90th St., Jackson Heights, L. I., N. Y.

Fecht, T. E., from Dalrymple Kelvinator Co., 2842 W. Grand Blvd., Detroit, Mich to 1563 E. 21st St., Cleveland, Ohio.

Fuchs, Geo. F., from 708 4th Ave., High Point, N. C. to 956 Waverly Way, N. E., Atlanta, Ga.

Hamilton, Wm., from 4241 Broadway Ave., to 4337 Clarendon Ave., Chicago, Ill.

Horn, A. C., from 122 Elm St., to 84 East Brown St., West Haven, Conn.

Krag, W. C., from c/o Welsbach Co., Gloucester City, N. J., to 4800 Walnut St., Philadelphia, Pa.

Morash, B. H., c/o Kelvinator, Ltd., 30-35 Drury Lane Kingsway, to c/o Kelvinator, Ltd., 258 Gray's Inn Road, London, W. C. 1, England.

Park, Bensiger & Co., from 26 Old Slip to 90 West St., New York, N. Y.

Patton, J. E., from 1143 Shenandoah St. to 448 No. Hayworth Ave., Los Angeles, Calif.

Robertson, E. R., from Hot-N-Kold Corp., 417 Sutter, San Francisco, to Hot-N-Kold Shop of Burlingame, 1319 Burlingame Ave., Burlingame, Calif.

Roberts, George, from c/o Hajora Corp., 1132 Ridge Ave., Philadelphia, Pa., to Welsbach Washington Co., 1714 M St., N. W., Washington, D. C.

Rocky Mountain Radio Corp., 1512-16 Broadway, to 1153 Bannock St., Denver, Colo.

Sayers, G. A., from 209 Sullivan Place to 148 Montgomery St., Brooklyn, N. Y.

Seoble, H. A., from Hot-N-Kold Corp., 417 Sutter, to 363 14th Ave., San Francisco, Calif.

Wiener, N. J., from J. & J. Drysdale & Co., Peru 440, to 2009 Rivadavia, Buenos Aires, Argentine, S. A.

H. G. Rahn Takes Charge of Electric Refrigerator Sales For Buffalo Utility

Harold G. Rahn has been appointed manager of the refrigeration division of the commercial department, Buffalo General Electric Co., Buffalo, N. Y., a subsidiary of the Buffalo, Niagara & Eastern Power Corp. Mr. Rahn was formerly associated with the Frigidaire factory and with Frigidaire and Universal Cooler distributors in Buffalo.

Correction

In the June 19 issue of the News announcement was made of the appointment of H. S. Wright as vice president and assistant general manager of Time-O-Stat Controls Company, Elkhart, Ind. Mr. Wright's correct title is vice president and general manager.

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ELECTRICAL REFRIGERATION SUPPLIES CO., 51 BARCLAY ST., N. Y. CITY, are issuing a special price list semi-monthly. Dealers and service-men who are interested, may receive this list by sending name and address.

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ELECTRIC REFRIGERATION NEWS

The business newspaper of the refrigeration industry

VOL. 3, No. 23, SERIAL NO. 73

Copyright, 1929, by
Business News Pub. Co.

DETROIT, MICHIGAN, JULY 17, 1929

Entered as second class matter August 1,
1927, at the Post Office, Detroit, Michigan.

PRICE FIFTEEN CENTS

MODEL CODE IS OFFERED TO CHICAGO

FOOD PRESERVATION ADVERTISING TO GET UNDER WAY, AUG. 10

Number of Districts Reporting
Organizations Ready for Action

NATIONAL Food Preservation advertising is scheduled to start in September magazines. The opening shot of the campaign will be delivered in the September issue of the *Cosmopolitan*, which comes out on August 10. Other national advertisements will appear in magazines published during the month of August up to September 12, when a double page advertisement will appear in the *Saturday Evening Post*.

All the contributors in the National program are represented in the direction of its activities. Earl Lines, advertising manager of Kelvinator Corp., Detroit, is a member of the national publicity committee and represents both the cabinet and electric refrigerator industries.

The Harder Refrigerator Co., Cobleskill, N. Y., has contributed to the food preservation program, although its name was omitted from the honor roll printed in the program plan book.

Local councils are using the milk bottle jacket tie-up to secure the participation of the dairy interests in their cities. Many dairies are aiding the councils by underwriting part of the cost of the undertaking, while others have volunteered to put the jackets on the bottles which they distribute to their customers.

Ice companies are co-operating with the national committee and recently two large orders for promotion literature were received from concerns in Dallas.

Field representatives who are helping regional directors in organizing local councils, arranging plans for co-operation in the national program are: E. W. Bernard, G. B. Crissman, J. K. Hoagland, E. M. Martinez, J. W. Moore, E. W. O'Meara, C. L. Smith, S. W. Tallaferro, H. Taylor, Harry Templeton, L. J. Turner, George O. Browne and C. J. Pettinger.

M. E. Skinner of Albany, N. Y., regional director No. 3, reports that he has his organization lined up for New York state outside the metropolitan area and is ready for action. The Mohawk Hudson Power Corp., as a preliminary step to the National Food Preservation Program, has divided the state of New York, outside the metropolitan area, into eleven districts and named a representative who will be responsible for the educational campaign in each territory. The appointees are: F. C. Coupel, Buffalo; Niagara & Eastern Power Corp., Buffalo; Helen Smith, Rochester Gas & Electric Corp., Rochester; Henry Coleman, Empire Gas & Electric Co., Geneva; C. C. Wiewag, Elmira Light, Heat & Railroad Co., Elmira; C. R. Rudy, Binghamton Light, Heat & Power Co., Binghamton; A. D. Dudley, Syracuse Lighting Co., Inc., Syracuse; W. Nye Smith, Northeastern Power System, Rome; A. M. Stack, Utica Gas & Electric Co., Utica; F. M. Houston, New York State Electric Corp., Oneonta; H. E. Dexter, Central Hudson Gas & Electric Corp., Poughkeepsie and J. H. Van Aernan, New York Power & Light Corp., Albany.

A keen interest is being manifested in
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GEORGIA POWER HITS \$1,048,039 MARK IN 52 DAY SPRING DRIVE

Nearly \$1,000 in Prizes Awarded
to Salesmen and District Mgrs.

THE Georgia Power Co., Atlanta, Ga., reports that refrigeration sales totaling \$1,048,039 were made during the spring drive that was concluded on June 29. Every district of the Atlanta utility made its quota in the campaign. Atlanta stores reported sales amounting to \$544,989 or 145.3 per cent of their quota, while the outside districts sales totaled \$503,050 or 134.1 per cent of their quota.

The Rome division lead in standings with refrigeration sales totaling \$97,003 or 166.3 per cent of its quota, while Atlanta topped second place honors. Nearly \$1,000 in cash prizes were awarded to salesmen and district managers for leading in their respective fields. General Electric refrigerators and Kelvinator commercial units were featured in the 52 day drive.

COPELAND FIRMS ARE STRIVING FOR PLACES IN NATIONAL CONTEST

Trophies Will Be Awarded to
Winners in Each Class

DESIGN of the eight cups which will be presented to the group winners of the Copeland Products, Inc., national sales contest was selected by the contest officials a week ago. The contest, embracing most of the company's 2,000 distributors and dealers in the United States, is daily taking on momentum as competition and enthusiasm grow.

Standings, as of June 15, show a shifting of leading contenders in each of the eight groups with newcomers replacing those listed among the first five in each group on June 1 and some of the first and second-place contenders on that date now being lower in the listings.

In Group 1, Copeland Refrigerating Co., New York, was first on June 15, and Copeland Refrigeration Co., Chicago, second. Beaudette & Graham, Boston, was leading in Group 2, followed by Copeland St. Louis Co., St. Louis. In Group 3, A. L. Fink Electric Co., Cincinnati, moved to first from fifth place and Harper-Meggee, Seattle, remained in second. Tulsa Copeland Refrigeration Co. was the new leader in Group 4 and Charles Rice, Inc., Springfield, Mass., had returned to second place. Hagen Furniture Home, Hammond, Ind., was leading in Group 5 and Copeland Refrigeration Co., Charleston, W. Va., had moved into second place. East End Cycle Co., Middletown, O., retained first place in Group 6, with Knight-Copeland Co., Colorado Springs, the new second-position holder. Group 7 had a new leader in the Feltus Engineering Co., Vicksburg, Miss., with Walter Connally Co., Tyler, Texas, second. Group 8 leadership was unchanged, the Knecht-Feeney Electric Co., Mt. Vernon, O., but J. A. Portner, Wheaton, Ill., had moved up into second place.

The contest will end Jan. 1. The various groups have been determined on a population basis. The winner in each will be presented with a specially designed silver cup, which becomes a permanent trophy following three victories.

SPECIAL COMMITTEE DRAFTS SAFETY ORDINANCE TO MEET DEMANDS OF CITY COUNCIL

National Regulations Combined With Underwriters' Rules on Multiples

AROUSED by the announced intention of the Chicago City Council to draft an ordinance restricting the installation of electric refrigerators in that city, a special committee of engineers representative of the industry tentatively agreed on a model code for regulating the construction and installation of refrigerating systems Thursday, July 11, at Chicago.

This code, a modification and an outgrowth of the proposed National Safety Code sponsored by the American Society of Refrigerating Engineers and including features of the National Board of Fire Underwriters' Code, was presented to a sub-committee of the

Health Committee of the Chicago City Council Thursday afternoon in the City Council chambers. It was offered as a substitute for an ordinance proposed by the Chicago Health Department.

Working with a view of formulating a national code as well as an ordinance for Chicago, the manufacturer's committee reached an agreement Thursday noon after two days and nights of concentrated activity. The committee was composed of:

R. Bourke Corcoran (chairman), Electric Association, Chicago.

Glenn Muffly, Copeland Products, Inc., Detroit.

C. C. Spreen, Kelvinator Corp., Detroit.

E. T. Williams, Servel, Inc., New York City.

Harry D. Edwards, Carbide and Carbon Co., Schnectady, N. Y.

R. E. Smithson, Frigidaire Corp., Dayton, O.

R. W. Kritzer, Peerless Ice Machine Co., Chicago.

A. H. Baer, Frick Co., Waynesboro, Pa.

John Usher (ex-officio), Mid City Heating Co., Chicago.

As a result of several recent illnesses and one death which Chicago health authorities alleged were caused by refrigerant gas leaks, the Health Committee of the City Council met Friday, July 5, and recommended an entire redrafting of sections of the city code which regulate the installation and control of mechanical refrigeration. A subcommittee was appointed to draw up the new ordinance.

After Health Commissioner Arnold H. Kegel had invited refrigeration manufacturers to send representatives to help with the formation of the new code, the City Council subcommittee met Monday, July 15, and heard the report of the Chicago health department. The latter group presented evidence collected in five recent cases in support of their argument that the installation of refrigeration units should be controlled, and offered a tentative ordinance.

Before the adjournment of the Monday meeting, industrial representatives agreed to present their case before the subcommittee the following Thursday afternoon. In preparation for this meeting, a large group met at the Chicago Electric Association headquarters Tuesday morning.

Former Illinois State Senator Thurlow G. Essington, counsel for the Electric
(Concluded on Page 2, Column 1)

HOLMES PRODUCTION FOR 6 MONTHS 7,500

DURING the first four months of actual production and sales since January first of this year, a total of four thousand Holmes electric refrigerators have been sold, according to a report made today by J. M. Bickel, general sales manager of Holmes Products, Inc., of New York City and Bridgeport, Connecticut.

Production for the first six months of the present year at the Bridgeport factory totals 7500 units, Mr. Bickel states and production schedule is now averaging 100 units daily. During this six-months period, a distribution and sales force has been built up to a total of fifty distributors and more than one thousand dealers located throughout the country. Six different models of the Holmes electric refrigerator are now being manufactured.

Chemists Present Facts on Refrigerators



Appearing before the special committee of the Chicago City Council Thursday, July 11, three chemists, an engineer, and an attorney presented expert testimony in support of the model code drawn up by a committee representing the industry. At the extreme left is Assistant Health Commissioner G. A. Koehler. Next to him, in a dark coat, is Alderman Frank A. Sloan. Back of Alderman Sloan is Attorney Thurlow G. Essington, over whose head appears the white hair and glasses of E. T. Williams of Servel. In the left foreground, wearing a light coat and dark tie, is Alderman Joseph C. Ross; while behind him, in a white shirt and holding a paper, is Alderman Charles S. Eaton, chairman of the meeting. Alderman James H. Taylor, with mustache, appears just behind Alderman Eaton. In the right foreground of the picture, all wearing dark coats, are Health Commissioner Arnold H. Kegel; Thomas Coyle of Roessler & Hasslacher Co., and Harry M. Williams of Frigidaire Corp. In the rear center, next to E. T. Williams, is Glenn Muffly of Copeland Products, Inc. At Mr. Muffly's right is Harry D. Edwards of Carbide and Carbon Co., and in front of the latter is J. B. Churchill of the Ice-master Corp.

KELVINATOR REPORTS COMMERCIAL SALES 119% OVER '28 MARK

ACCORDING to J. M. Fernald, head of the commercial sales department of Kelvinator Corporation, Detroit, sales of Kelvinator commercial equipment during the first half of this year stand 119% over those for the same period during 1928. By the end of the year he expects that this figure will be increased to 150%.

The average dealer, according to Mr. Fernald, may easily increase his present business from forty to fifty percent by the expenditure of a little more endeavor in the field of commercial refrigeration.

In the larger centers, commercial installations represent, in dollars and cents, approximately forty percent of the total refrigeration sales of Kelvinator dealers. The fact that selling commercial refrigeration is not seasonal makes the handling of this class of business an economical necessity for any concern exclusively
(Concluded on Page 11, Column 2)

COMMITTEE DRAFTS CODE FOR CHICAGO

(Concluded from Page 1, Column 5)

Association, was selected to handle the manufacturers' case before the City Council; and the committee named above was authorized to redraft the proposed National Safety Code and submit it to the City Council subcommittee in lieu of the code worked out by the Chicago health department.

This special committee immediately went into session, and emerged just before the hearing Thursday afternoon with a tentative model ordinance. It was presented to the City Council subcommittee by Senator Essington.

To conclude the manufacturers' case, J. B. Churchill, consulting engineer of the Icemaster Corp., and Thomas Coyle, service engineer of the Roessler and Hasslacher Chemical Co., presented evidence to prove that methyl chloride is a safe refrigerant; and Harry M. Williams, chemical engineer for the Frigidaire Corp., did a similar service for sulphur dioxide.

The City Council subcommittee then adjourned for two weeks to consider the code presented by the manufacturers and the Chicago health department. Representatives of both groups will, in the meantime, meet with the subcommittee members and at the hearing scheduled for July 25 the subcommittee hopes to have the code completed and ready for adoption.

To shed further light in their deliberations on the proposed ordinance, the Health Department has announced that it will set up a number of different refrigerating systems in a set of model apartments just erected, and submit these refrigerating systems to exacting tests during a period of two weeks.

Front page publicity in the Chicago newspapers and press dispatches widely published in all parts of the country have had the effect of alarming present users and prospective buyers. This situation has proved disconcerting to distributors and dealers. In some localities competitive interests used paid advertisements elaborating upon the news reports, emphasizing unconfirmed statements and thereby added to the unrest. In Chicago, departmental officials of the city government were quick to recognize the possibilities of their responsibility to the public.

After the coroner's jury had issued a verdict that Mrs. Viola Clark of 926 Eastwood Ave., had died from inhaling methyl chloride gas from a leaky refrig-

SPOKESMAN FOR MANUFACTURERS



Thurlow G. Essington

Former Illinois State Senator and attorney for the Chicago Electric Association, who was selected to represent the industry before the Chicago City Council.

erator, the Boiler Inspection Department issued orders under emergency authority stopping all further installations of equipment using this refrigerant. An investigation of the city ordinances covering the installation of refrigerating systems revealed antiquated regulations, and the health commissioner immediately demanded the passage of a revised ordinance drawn up by his department.

The protests of local refrigeration men that the judgment of the coroner's jury was rendered without sufficient proof having gone unheeded it was generally agreed that the defensive measures required organization and that all interests concerned should act as a unit to handle the situation.

Elsewhere in this issue is published the testimony of the experts who were called to give city officials the facts concerning the various refrigerants and to explain the necessity for a comprehensive and uniform code for all parts of the country.

All Refrigerants Safe If Used Properly

PROPERLY safeguarded by the necessary municipal regulations and a strict regard for proper installation and design, refrigerant equipment using any of the ordinary refrigerants can be installed with reasonable safety.

—J. B. Churchill.

WITH the proper installation of mechanical refrigeration equipment followed by proper inspection, employing any of the generally accepted refrigerants, there is no reason why such equipment cannot be made safe.

—Thomas Coyle.

IF various kinds of refrigeration units are manufactured under suitable inspection and tests, are installed correctly mechanically, and if multiple systems are properly tested and safeguarded, then there is a minimum of danger to the public provided a suitable leak detectant is incorporated in the refrigerant.

—H. M. Williams.

ENGINEERS don't always agree. One says sulphur dioxide is the best refrigerant and another says methyl chloride—they both believe what they say and they are all honest. We engineers mostly agree that all of these refrigerants are safe when properly used, that there is no refrigerant that is safe if improperly used.

—Glenn Muffly.

ATTEND CHICAGO MEETING

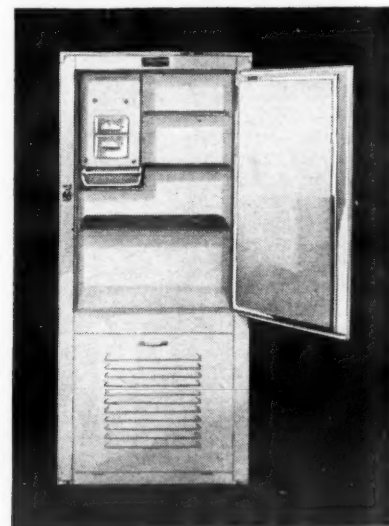
Attendance Record—Meeting of Refrigeration Interests, 10:30 A. M., Tuesday, July 9, 1929, at the Electric Club, Chicago, Ill.

L. P. Bannister, manager, Refrigeration Div., National Electric Mfrs. Association, New York City.
C. G. Bassler, attorney, representing General Electric Co.
S. C. Bell, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
H. E. Berg, Berg Ice Machine Co., Gardner, Mass.
G. E. Bloom, Holmes, Inc.
M. J. Brown, assistant to vice president, Roessler Hasslacher Co., Niagara Falls, N. Y.
B. F. Buelow, president, Reliance Ice Machine Co.
M. C. Burnside, manager, Absopure Co., Detroit.
H. L. Cagney, vice president, Norge Chicago Corp., Chicago.
J. B. Churchill, Ice Master Co., New York City.
F. M. Cookrell, Electric Refrigeration News, Detroit.
W. D. Collins, Servel, Inc.
W. L. Colterjohn, service manager, Absopure Co., Chicago.
L. F. Combs, Trupar Co., Chicago.
J. A. Connerty, Peoples Gas Light & Coke Co., Chicago.
H. W. Coon, York Ice Machine Co.
E. Cooper, Jr., E. Cooper, Jr., Inc., distributor for General Electric Co., Chicago.
R. B. Corcoran, manager, Electric Association, Chicago.
Thomas Coyle, Roessler Hasslacher Co., Niagara Falls, N. Y.
J. J. Donovan, General Electric Co., Cleveland.
H. D. Edwards, American Standards Association, New York City.
C. L. Eichstaedt, sales manager, Reliance Ice Machine Co.
T. C. Essington, counsel for the Electric Association, Chicago.
T. J. Fowler, Refrigeration Dept., American Foundry Equipment Co., Mishawaka, Ind.
A. De B. Gaines, Gregory V. Rose, Inc., distributor for Holmes, Inc., Chicago.
C. E. Gilham, Electric Refrigeration Co., Chicago.
P. B. Gordon, Welsbach Co., Gloucester City, N. J.
R. B. Harper, chief district engineer refrigeration, Peoples Gas Light & Coke Co., Chicago.
H. C. Hayes, chief engineer, Absopure, Detroit.
O. P. Heller, manufacturing refrigeration department, Creamery Package Co., Chicago.
G. F. Henry, Henry Valve Co., Chicago.
C. C. Hoagland, vice president, Capitol City Paper Co., Servel distributor, Springfield, Ill.
H. B. Howe, president, Howe Ice Machine Co., Chicago.
G. M. Johnston, president, Universal Cooler Co., Detroit.
C. J. Jolly, General Motors Co., Detroit.
H. H. Kahn, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

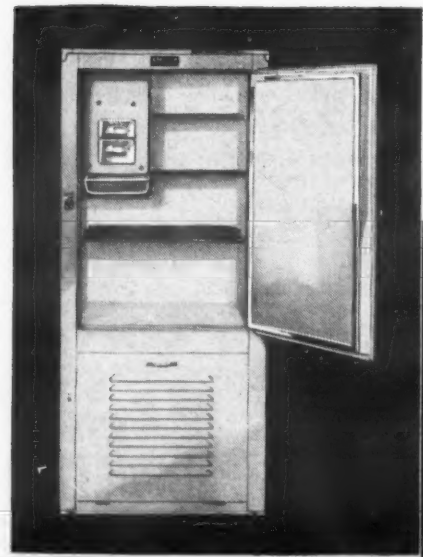
L. C. Keeley, vice president, Zerose Corp., Chicago.
H. T. Kessler, branch manager, Copeland, Chicago.
W. H. Kowles, Universal Cooler Corp., Chicago.
R. W. Kritzer, vice president, Peerless Ice Machine Co., Chicago.
Paul Kroeschel, Brunswick Kroeschel Co., New Brunswick, N. J.
H. S. Lacey, Electric Refrigeration Service, Chicago.
H. D. Laidley, vice president, R. Cooper, Jr., Chicago.
T. A. McGern, Mid City Heating Co., Chicago.
H. A. Malcolm, The Stover Co., Inc., Chicago.
R. E. Manly, branch service manager, Welsbach Co.
Frank G. Marshall, counsel for Copeland Products, Inc.
C. A. Miller, Servel, Inc., Chicago.
J. E. Moore, Climax Electrical Refrigeration Co., Chicago.
J. I. Morrison, Morrison Machine Co.
R. J. Mott, president, Norge Chicago Co.
Glen Muffly, consulting engineer, Copeland Products Co., (chairman N. E. M. A. Technical Committee), Detroit, Mich.
E. P. Nehrbas, Servel, Inc., Evansville, Ind.
J. P. Pratt, Mid-City Heating Co., Chicago.
T. S. Prendergast, director of service, Absopure Co., Detroit.
L. H. Rosenberg, Lord and Thomas & Logan, representative for General Electric Co., Chicago.
W. C. Rowles, Climax Electrical Refrigeration Co., Detroit.
E. A. Rykenboer, Roessler Hasslacher Co., Niagara Falls, N. Y.
Lewis Ruthenberg, president Copeland Products, Inc., Detroit.
M. M. Shaffer, factory representative, Frigidaire Corp.
R. E. Smithson, assistant manager branch operations, Frigidaire Corp., Dayton, O.
C. C. Spreen, Kelvinator Corp., Detroit.
Alfred Stepan, Roessler Hasslacher Co., Niagara Falls, N. Y.
A. R. Stevenson, Jr., General Electric Co., Schenectady, N. Y.
G. F. Taubeneck, Electric Refrigeration News, Detroit.
Harry Thompson, chief engineer, Universal Cooler Corp., Detroit.
D. C. Tyler, Reliance Ice Machine Co., Chicago.
John Usher, Ideal Heating Co., Chicago.
H. C. Wandis, refrigeration sales, Peoples Gas Light & Coke Co., Chicago.
C. L. Welch, president, Copeland Company, Chicago.
Stewart Weston, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
E. T. Williams, Servel, Inc., New York City.
H. M. Williams, chemical engineer, Frigidaire Corp., Dayton, O.
W. W. Williams, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
R. M. Winters, Midwest Engineering & Equipment Co., Chicago.
G. F. Zellhoefer, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
E. Zookerman, Carbondale Ice Machine Co., Carbondale, Pa.

ANNOUNCING

The largest, finest, most powerful electric refrigerators ever offered in the low price field



Three new models—full 5¼ cubic feet—full Copeland quality throughout—63 ice cubes—lowest prices in Copeland history



Not so long ago we told the trade to watch Copeland in 1929! And now comes additional evidence that Copeland is doing big things in a big way this year . . .

. . . for Copeland now announces the largest, finest, most powerful electric refrigerators ever offered in the low-price field . . . and the fastest-selling, greatest profit-making proposition ever offered an electrical refrigeration sales force!

Note the long list of features, shown in the box at the right. Study them carefully. Compare them with what you are now offering your prospects. Then write us for prices . . . so amazingly low that you will instantly sense the advantage of selling the new Copelands yourself instead of trying to compete against them!

Copeland is destined to climb to even greater heights of popularity and profit during 1929 . . . right now is the time for ambitious distributors and dealers to think fast and think hard about taking on the Copeland line. We'll correspond with you promptly and privately.

COPELAND SALES CO., 630 LYCASTE AVE., DETROIT, MICH.

Compare these 17 value features:

- Full 5¼ cu. ft. storage space
- Height, 55½"; width, 24½"; depth, 22¼"
- 8.92 sq. ft. shelf area
- Lacquered steel exterior
- Plain or Super-Ascaloy front
- Enamel or porcelain interior
- 2 ice drawers, 1 double-depth
- 63 ice cubes
- Rubber ice tray
- Coldtray for salads, etc.
- No insanitary drain pipe
- Gasket-sealed doors
- Heavily plated hardware
- Shelves at convenient height
- Generous space between shelves
- Quiet, economical operation
- Automatic temperature control

Copeland

DEPENDABLE
ELECTRIC
REFRIGERATION

BIGGER, easier commercial PROFITS

with the Flexible SERVEL LINE

It enables you to build installations from stock,
cuts sales and erection costs, simplifies
engineering, eliminates special equipment

NEVER has there been such a profit-opportunity in commercial refrigeration! The flexible Servel Commercial Line offers the dealer a chance to make *more* money . . . and to make it *more easily* . . . than ever before!

That's because Servel makes everything so simple for him. His engineering's simplified—a salesman can do practically all of it right in the customer's office. No special equipment is necessary—practically every installation can be built from stock. And erection costs are far less—one man can install nearly any job.

So easy to adapt

See how easy it is! For instance, no more coils have to be specially built. Instead, there are the new all-copper chilling sections.

These sections come in many sizes. They are easily adaptable to any installation. The dealer can carry a supply of various sizes and build up practically any installation from his stock.

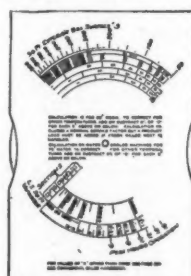
He'll have no left-overs, either, for he'll be able to use every size on new jobs or extensions. And the heaviest weighs only 60 lbs. . . . so light one man can easily handle it.

Every Salesman can estimate

Engineering? Why that's been made so simple that any salesman can do most of it while he's talking to a prospect!

It's all due to the new Servel CALCULATOR—a pocket device that does practically all the necessary calculating in a few moments time.

Of course, when there is any special engineering to be figured, the Servel engineering department is at the dealer's service. And he can be sure of getting mighty quick assistance!

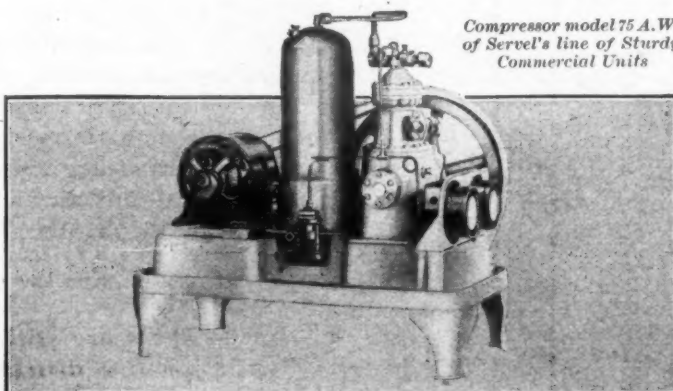


Actual size of this calculator is 5 inches high

Steady, dependable performance

And once installed, what service Servel gives! Take those machines—sturdily built, every one of them . . . with heavy castings. They'll stay on the job for years!

Slow-speed, too, all of them. That means less frictional wear. And unusually quiet. That's a big selling argument for cafeterias where the machine is right under the counter.



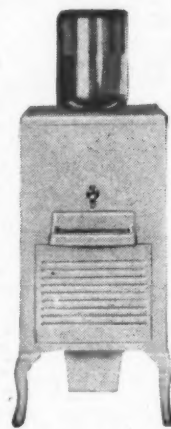
Compressor model 75 A.W. of Servel's line of Sturdy Commercial Units



Check up on this for yourself

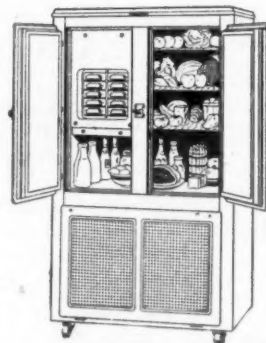
Check up on the commercial business in your town. You'll be surprised at how much there is when you really begin to look for it. Water-Coolers are a fast-selling line also. You will find many interested buyers among office managers.

Then write for full details on the Servel Commercial Line. Once you see how easy it is to handle, you'll realize how much profit can be yours for the taking.



There's real profit in Servel water-coolers

The NEW SERVEL builds domestic business, too



Better Housekeeping Features are built in Servel domestic cabinets

But don't think for a moment that Servel has neglected the domestic field. In the NEW SERVEL, you have as fine a line of household refrigerators as can be made.

In fact, the NEW SERVEL goes a step farther in refrigerator construction. The main features are all there, of course . . . remarkable quietness . . . big ice-making capacity . . . economical operation . . . absolute dependability, winter and summer.

But the *details* have been carefully planned, too . . . lots of little refinements that save work for the woman who has to use her refrigerator so much every day. And maybe they don't make a hit when they're pointed out! They're always a big selling argument with any woman.

The NEW SERVEL line has a size to cover the needs of every family. And every model is a beauty! No dealer need fear competition with this good-looking, efficient refrigerator.

SERVEL SALES, Inc.

EVANSVILLE, INDIANA

ORGANIZED INDUSTRY ANSWERS CHARGES

Senator Essington Presents Manufacturers' Safety Plans

EXPLANATORY

On this page are to be found two talks made by representatives of the industry before the special committee of the Chicago City Council, July 11, (see pages 1 and 2 for complete story). Senator Essington, whose speech is recorded in full on this page, fired the opening gun in the defense of the manufacturers against the charges made by the Health Department. Senator Essington also introduced J. B. Churchill, Thomas Coyle, and Harry M. Williams, each of whom presented a technical paper on the nature and properties of a refrigerant.

As I stated at the last hearing of this committee, I have been authorized and instructed, as counsel for The Electric Association, to appear at this and other hearings of the committee in the interest of the mechanical refrigeration industry.

The Electric Association is composed of various branches of the electrical industry, including utilities, manufacturers, wholesalers, dealers and contractors.

Working through the agency of The Electric Association, representatives of all of the larger manufacturers of mechanical refrigeration devices and representatives of most of those manufacturers of whatever size met in Chicago on Tuesday of this week, and, in line with what was suggested at the hearing of this committee on last Monday, formed a committee to meet and advise with your committee with reference to the suggestion that an ordinance be drafted having for its purpose the regulation of the installation of mechanical refrigerating systems in the City of Chicago.

Need For Frankness

With the idea clearly in mind that proper and well-considered regulation will be in the interests of the public and the industry, there is every reason for absolute frankness and complete co-operation between the two committees.

In view of the technical questions which are involved, it is to be hoped that, as in the case of the Electrical Code of the City of Chicago, adopted as a result of intensive and co-operative effort on the part of the city authorities and every branch of the industry, so this particular situation may be met squarely, and a mechanical refrigeration code adopted which will serve as a precedent for similar codes throughout the country.

Rapid Development

As in the case of the aeroplane, the mechanical refrigerator has developed very rapidly in a comparatively short period of time. More than two millions of such refrigerators have been installed within recent years, serving probably ten million people who are in daily contact with them. It is believed that there will be a million more installations within the next twelve months.

It is an unusual opportunity which is presented to the industry to work with your committee in outlining proper and suitable safeguards in the installation of such equipment, which may be used as a model throughout the country.

Recent publicity has been the occasion of some alarm in connection with the use of mechanical refrigeration; over-emphasis has been given to the so-called dangers due to the accidental escape of refrigerant fluids used in mechanical refrigerators.

No Cause For Alarm

The unanimous engineering and chemical opinion is that there is no cause for any alarm or uneasiness in this regard any more than there is in the cases of other chemicals and gases to which we are exposed constantly in normal life, the hazards of which far exceed those which have been attributed to mechanical refrigeration.

With the proper installation of mechanical refrigeration, employing any of the generally accepted refrigerants, the public has no cause for alarm. From more than two million installations throughout the country, of which more than one hundred and fifty thousand installations are in the City of Chicago and the suburbs, some of which have been in constant use for from twelve to fifteen years, there have been very few cases in the entire country, and only one case in the entire Chicago district, where a death certificate has been issued directly attributing such death to accidents resulting from the use of mechanical refrigerators.

Unfavorable Publicity

However, publicity and interest during

the recent weeks have been directed toward instances where mechanical refrigeration is suspected of working injurious results and it is for that purpose that we are here today to discuss the situation frankly with you and to join with your committee in recommending the passage of such regulatory measures as may seem justified or required.

As I stated a few moments ago, this industry is one of recent and phenomenal growth. However, the research bureaus and organizations have for several years directed their attention toward the perfection of refrigeration devices and the absolute protection of those using them. For many months there have been study and work on the question of a code controlling the methods of installation of mechanical refrigerators. Participating in those conferences have been the following:

American Institute of Refrigeration
American Chemical Society
American Gas Association
American Institute of Electrical Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
American Society of Refrigerating Engineers
American Warehousemen's Association
Association of Governmental Officials in Industry
National Electric Light Association
National Electric Manufacturers' Association
Compressed Gas Manufacturers' Association
Eastern Ice Association
International Acetylene Association
International Association of Industrial Accident Boards and Commissions
Safe Transportation of Explosives
National Association of Ice Industries
National Association of Practical Refrigerating Engineers
National Bureau of Casualty & Surety Underwriters
National Fire Protection Association
National Safety Council
New York Board of Fire Underwriters
New York City Bureau of Fire Prevention
Refrigerating Machinery Manufacturers' Association
Underwriters' Laboratories
United States Bureau of Standards
U. S. Department of Labor
American Society of Heating and Ventilating Engineers

Every Consideration Given

A study of that list clearly indicates that every precaution has been taken to insure that every consideration shall be given to the subject. Efforts have been directed toward providing for not only the safety of the residents but the individual worker, the office employee, the amusement seeker and the industrial worker in whose lives refrigeration plays such an important part.

Consideration has been given not only to the small refrigeration unit but also the larger units found in every establishment producing and dispensing perishable products.

Consideration has been given to the refrigerant used, and also to such things as: what these refrigerants are contained in; how these containers are designed, tested and installed; what safety devices are provided; where systems of various sizes shall be permitted; and many other things with which few except members of the industry are familiar.

Need Common Standard

The industry feels that it would be most regrettable if different standards were provided in different cities of our country, as the cost of meeting different requirements would prevent many from obtaining the benefits of food preservation.

The Health Department of this city has drafted and presented to you for your consideration, a draft of a proposed ordinance covering the installation of refrigeration systems. This draft includes admirable provisions, but we believe that the best interests of this community will be served if consideration is given not only to the refrigerants employed but also to the method of their employment.

With all of these efforts and studies and research as a background, the committee which appears before you today has prepared a draft of an ordinance or code "regulating the design, construction and installation of refrigerating systems circulating a volatile substance to produce refrigeration," following closely the Code of the American Standards Association, which we shall hand to your committee today for your study and consideration.

Ordinance Is Comprehensive

Very frankly, the presentation of this draft creates rather an unusual circumstance in that, in our opinion, the ordinance is more comprehensive and suggests a greater degree of regulation and control in the city than is suggested in the ordinances already receiving the consideration of your committee.

I mentioned a few minutes ago that the entire matter is a highly technical one. The draft of an ordinance which we are presenting today is not presented to you as a perfect instrument; it is, however, the result of long consideration and extensive study and will suggest to your committee the matters which should receive your consideration.

It is desired by the members of the committee presenting this draft of ordinance that they have the opportunity of submitting this draft of ordinance to their engineers and legal staffs, and that, in the light of that further consideration, they be permitted to make further suggestions and recommendations to your committee after your committee, likewise, has had this opportunity of examination and study.

We were accorded the privilege, at the last meeting, to reserve our right to cross-examine at this hearing those who appeared before the committee at that time. It is my suggestion that we be permitted to call certain witnesses before this committee at this time, feeling that, in the discussion which will undoubtedly follow their statements, the points which might otherwise be raised by cross-examination will be covered in that discussion.

I desire to call in order the following:

J. B. Churchill
Thomas Coyle
H. M. Williams

I present to the committee a copy of the draft of ordinance which I mentioned some time ago. I suggest that, when this committee and the Department of Health, and such other departments of the city as may be interested, have had an opportunity to analyze this draft, we be given an opportunity to explain in detail the provisions of the draft of ordinance as now submitted.

J. B. Churchill Gives Facts Concerning Methyl Chloride

J. B. Churchill, consulting chemical engineer. Home address: Plympton, Mass. New York address: The Chemists' Club, 52 East 41st street. Representing, by request, The Roessler and Hasslacher Chemical Co. of Niagara Falls, New York.

Education and experience: Harvard University 1896-1899, graduating from Chemistry. Took position as instructor in chemistry in the Pennsylvania State College, in Department of Chemistry. Held various positions there until 1911, when I was appointed to the Professorship of Industrial Chemistry. Granted two years' leave of absence for further study in Europe. This time was spent at University of Goettingen in organic research on essential oils.

In 1914 I accepted a fellowship in organic chemical research in the Mellon Institute of Pittsburgh (British American Chemical Fellowship). From 1916 to 1918 I acted as Director of National Association of Tanners' Research Laboratory. From 1918 to 1921 Technical Director British American Chemical Co. of New York. Consulting work 1922 to date.

I am consulting engineer for the Irving L. Keith interests of Haverhill, Mass., and as such, consulting engineer for the Ice-master Co. of Haverhill, Mass., which manufactures refrigeration machinery, using methyl chloride as a refrigerant. I am a member of various technical associations, including the American Society of Refrigerating Engineers.

May I make the following statement:

A very limited number of the millions of chemical compounds known have the necessary physical properties to be used as refrigerants. These represent the compounds of the simplest composition, all of them have been known long and, to a great extent, most carefully studied. Excluding those substances whose chemical properties would render them manifestly unfit as refrigerants, we have the following that might be used as commercial refrigerants:

Air	H ₂ O
Water	CO ₂
Carbon Dioxide	NH ₃
Ammonia	SO ₂
Sulphur Dioxide	CH ₃ Cl
Methyl Chloride	C ₂ H ₅ Cl
Ethyl Chloride	C ₃ H ₇ Cl
Ethane	C ₂ H ₆
Propane	C ₃ H ₈
Butane	C ₄ H ₁₀
Iso butane	C ₄ H ₁₀
Dichlor Methane	CH ₂ Cl ₂
Dichloro Ethylene	C ₂ H ₂ Cl ₂
Trichlor Ethylene	C ₂ HCl ₃

The more common properties of most of these substances are given in the America Society of Refrigerating Engineers' Circular No. 2, "Properties of Refrigerants," and more complete physical data concerning them is published in the A. S. R. E. circular No. 9, "Tables of Thermodynamic Properties of Steam

(Concluded on Page 5, Column 1)



ZEROZONE

Distributors who are "refrigerator wise" and prospects who appreciate better than ordinary quality are quick to approve of the new, beautiful Zerozones. Zerozone is the product of engineers famous for their advanced developments in automatic refrigeration. With their knowledge and ability it is only natural that they should create so fine a line as ZEROZONE.

ZEROZONE at once signifies high

quality—finest materials—master craftsmanship—precision manufacturing—skillful assembly—painstaking thoroughness—unequalled performance—quiet operation—and generous value.

ZEROZONE offers a comprehensive line—its completeness enables you to supply a unit to cover every refrigeration need—either for domestic or commercial use.

There are still a few select territories open for live distributors. Write us for details.

Zerozone
Lifetime Refrigeration

ZEROZONE CORPORATION—927 E. 95th STREET—CHICAGO

MADE BY CHICAGO HEALTH DEPARTMENT

(Concluded from Page 4)

Refrigerants and Brines." Both of these are submitted with this statement.

Regulation Necessary

Of these refrigerants listed, only air and water are completely free from all toxic or other hazards, and they are not suited for practical use with small refrigerating equipment intended for household purposes. For this reason it is vitally necessary that all installations and especially those installed in buildings used as living quarters be subject to strict municipal regulation by means of such codes and restrictions as will promote a full measure of public safety. This is feasible, and with such regulation it should be possible to use any of the common refrigerants, with an assurance of completely safeguarding the public from fatalities or injury to health.

Probably the best authority in the world for the specific properties of any substance is the "International Critical Tables." Pages 318-321, Vol. II, give the toxicological data for most of the substances used as refrigerants. Photostats of these are submitted.

The relative toxicity of most of the refrigerants is given on page 31 of Public Health Bulletin 185, published by United States Public Health Service, 1929. The data for this report was furnished by United States Bureau of Mines.

Other Data Cited

Other data on the relative toxicity by weight of the various refrigerants taken from the great German industrial authority, i.e., Lunge's "Chemische Technische Untersuchungs-Methoden," are presented on page 9 of A. S. R. E. Circular No. 2 already mentioned. On this page will also be found the relative concentration by weight of vapor of the various refrigerants in a room of given size which will produce the same effect. This is:

Carbon Dioxide	100
Ethyl Chloride	80
Methyl Chloride	70
Ammonia	2
Sulphur Dioxide	1

It is the writer's opinion that properly safeguarded by the necessary municipal regulations and a strict regard for proper installation and design, refrigerant equipment using any of the ordinary refrigerants can be installed with reasonable safety. It may not be out of place to call particular attention to methyl chloride upon which considerable interest has been focused recently.

In considering the hazard attendant upon the use of any compressed gas, whether used as a refrigerant or for other purposes, we must take the most careful cognizance of the fact that this hazard increases very rapidly with the amount by weight and the degree to which it is distributed throughout a building.

Methyl Chloride Safest

In the writer's opinion all known and published facts would indicate that methyl chloride is the safest refrigerant available for fractional ton work, for the following reasons:

(1) Up to the time of the Lincoln Apartment house case in August, 1928 (1940 Lincoln Ave., Chicago) there were no authenticated reports of accidents or deaths due to the use of methyl chloride in America, French or German literature, to the writer's knowledge. At that time Dr. Otto Amend of New York, at the writer's request, sent a cablegram to the Chemiker Verein, the official society of Germany, asking:

"Is there authenticated record of death from methyl chloride industrial poisoning? Answer no or advise where."

He received their reply September 13, 1928, reading as follows:

"In Deutschland ist kein todesfall oder industrieller unfall durch methylchloride bekannt oder amtlich gemeldet worden Chemikerverein Professor Klages."

Translation of above radiogram:

"There have been no deaths or industrial accidents from methyl chloride known or legally recorded in Germany. (Signed)

Chemikerverein Professor Klages." Photostat copies are submitted.

Selected by France

(2) The selection by the French Government of methyl chloride as a refrigerant on naval vessels where the safety requirements are the most stringent is a strong argument for its safety.

(3) My acquaintance with methyl chloride dates over a long period of time. During my study in the University of Goettingen I had occasion to use methyl chloride in organic work for months at a time with constant exposure to its vapor. No sickness or ill health resulted.

(4) In manufacturing work at the plant of the British American Chemical Co. at Ridgefield Park, N. J., I had occasion to manufacture and use methyl chloride in fairly large quantities. The apparatus was not especially well suited for our purposes, and both myself and workmen were often exposed to high concentration of methyl chloride vapor, on several occasions to a point where unconsciousness resulted. This work was carried over a period of five to six months, and although both myself and my workmen were frequently exposed to methyl chloride, no ill effects were noted.

Due to the above facts I selected methyl chloride as the safest and most practical refrigerant for the Icemaster Co. to use.

Thomas Coyle Tells Results of Methyl Chloride Research

(Statement Before Special Committee of Chicago City Council, July 11)

I, Thomas Coyle, of Niagara Falls, N. Y., am Service Engineer for the Roesler & Hasslacher Chemical Co. of Niagara Falls, N. Y., hereafter called the company.

I was graduated from Lehigh University with the Degree of Chemical Engineer in 1909, and have been subsequently engaged to present date with the above-mentioned company.

For fifteen years, subsequent to 1909, I was engaged in charge of the production of caustic soda electrolytically, liquid chlorine and chloroform; and since 1925, to date, have been engaged in charge of technical service specializing in liquid chlorine, liquid bleach, methyl chloride, ethyl chloride, methylene chloride, trichlorethylene, tetra chloroethane and chloroform.

Organizations Listed

Am now a Director of the Chlorine Institute and a member of the Test and Specification committee, also the committee on hydrocarbons other than acetylene for the Compressed Gas Manufacturers' Association.

Am a member of the American Chemical Society and the American Society of Refrigerating Engineers.

I now present the following on methyl chloride:

Methyl chloride is a colorless and non-corrosive liquefiable gas of faintly sweet ethereal odor and is transparent both as a liquid and gas.

It boils at 10.65° F. at atmospheric pressure, and as a liquid has a density of 1.00 as compared to water at 39° F. As a gas, it has a density of 1.78 at 32° F. and atmospheric pressure as compared to air at 1.0.

Highest Purity

The methyl chloride shipped by the company is of the highest purity, as attested to by the National Board of Fire Underwriters as a result of tests made in their laboratories at 207 East Ohio street, Chicago.

The Fire Underwriters conducted tests originally reported in their work "Miscellaneous Hazard No. 1418" of August 26, 1926, at which time they found the methyl chloride to test 99.60% methyl chloride, 0.14% permanent gases (such as air), and a small fraction of residue resulting from cylinder scale.

Annual check tests are now run by the Underwriters on stock methyl chloride for the purpose of keeping it to original standards.

Careful Tests

In addition, each batch when made is carefully tested by competent chemists at the Niagara Falls plant before shipping in steel cylinders, which previously have been thoroughly cleaned by washing with water, rolling shot in the interior to remove any mill scale, steaming and sealing before cooling. The presence of moisture is very carefully watched to avoid its freezing out in the expansion valves of refrigerating equipment.

Referring to the history of methyl chloride in the United States, the company was the pioneer and is now, to the best of my knowledge, the sole producer in this country.

Research work begun at the Perth Amboy plant of the company in 1913, under Dr. B. S. Lacy, was delayed during the World War and resumed at the St. Albans, W. Va., plant of the company during 1919, under the direction of Dr. Lacy, and finally came into the production stage at Niagara Falls on December 28, 1922, under Dr. E. A. Rykenboer.

Experiment Related

At St. Albans, Dr. Lacy conducted experiments to determine the physiological effect of methyl chloride upon human beings, selecting himself as the subject.

Quoting his report of March 2, 1928, presented as an affidavit, I mention his experience.

Using a gas mask fitted to the face and connected to cylinders containing known mixtures of methyl chloride vapor and air, Dr. Lacy subjected himself to concentrations of 2%, 4%, 5%, 10%, and 20% by volume of methyl chloride equivalent to 2.6 lbs., 5.2 lbs., 6.5 lbs., 13.1 lbs. and 26 lbs. respectively, in a closed room of 1,000 cu. ft. of space. At 2% (2.6 lbs. per 1,000 cu. ft.) Dr. Lacy felt no effect other than slight muscular sensations and slightly labored breathing over a period of nine minutes.

At 4% (5.2 lbs. per 1,000 cu. ft.) Dr. Lacy experienced muscular sensations, perspired freely, experienced no difficulty in walking or in using hands after seven minutes. He could have continued for a longer period.

At 5% (6.5 lbs. per 1,000 cu. ft.) the same sensations were experienced as with 4%.

Anesthesia Possible

At 10% (13.1 lbs. per 1,000 cu. ft.) distinct preliminary symptoms were experienced but there was no difficulty in walking. Continuing, more pronounced sensations of muscular activity were noticed. Conclusion was drawn that at this concentration it would have been possible to produce anaesthesia.

In order to observe the effects on the

eyes, Dr. Lacy allowed sufficient methyl chloride to escape in a closed room of 500 cu. ft. volume, i.e., 20% by volume (26 lbs. per 1,000 cu. ft.) to produce anaesthesia in less than one minute. Complete unconsciousness was produced. Subject was led out, was unconscious for ten minutes, followed by vomiting. No other or permanent effects were afterward noticed, and the services of a physician were not necessary.

No Physicians Needed

Dr. Lacy also declared that during the several years during which he handled methyl chloride, during which period the apparatus was not always tight and leaky conditions prevailed, that never was it necessary to call a physician to treat one of his men nor was it necessary to send one of his men to a physician for treatment due to exposure to methyl chloride. Men were at various times doxy from exposure.

Under date of March 9, 1928, Dr. E. A. Rykenboer reported on a series of tests on six canary birds made under their supervision at Niagara Falls, N. Y., where the birds were exposed to percentages of methyl chloride in air at 0%, 0.01%, 0.03%, 0.09%, 0.67% and 2%.

Canary birds were chosen by reason of their recognized sensitivity, as claimed by the Bureau of Mines.

Canary Experiment

Each bird was in a separate glass container and was not touched by hands.

The container was sealed from the outside by having the outlet tube dipping several millimeters below the surface of the water in a test tube.

Air prepared with the specified percentage of methyl chloride was added to the containers at a constant rate of 20 liters per hour, which rate was greatly in excess of the air requirements of the birds. The experiments were constantly supervised. Records of the apparent conditions of the birds were taken at frequent intervals.

About 5 grams of bird seed and a small cup of water were placed in each cage.

One experiment was conducted as a control with no methyl chloride present, otherwise similar to that of the other five experiments.

Results Tabulated

Results:

1. Concentration of 2% methyl chloride in air produces noticeable physiological effects in 1½ hours.

2. Serious physiological effects with 2% mixtures were observed after exposure for 4 to 5 hours.

3. With exposures to a concentration of 0.67%, the reactions were the same as in the 2% case but delayed.

4. For concentrations under 0.1% no physiological reactions were observed after continued exposure of 22 hours; the birds after removal were perfectly normal and are alive today.

With a view to further studying methyl chloride and the addition of a suitable odorant, the company has conducted and is now conducting extensive experiments.

The work has been conducted at Niagara Falls under the supervision of Dr. P. J. Carlisle and Dr. C. R. Harris. Up to the present time the following odorants have been investigated in the laboratory:

Odorants Listed

Alpha ionone, ethyl acetone, diethyl car-

bonate, pyridine, amyl butyrate, methyl anthranilate, methyl salicylate, diphenyl oxide, citronella, oil of pine, oil of eucalyptus, oil of lemon, oil of geranium, oil of peppermint, oil of cassia, oil of sassafras, oil of tar, methyl isocyanate, chloracetone; alpha, gamma-dichloracetene; alpha, beta dichloronethyl ether; dimethyl sulphide, methyl mercaptan, and sulphur dioxide—from which list it is hoped to secure a suitable odorant.

With a view to securing further information on the toxicity of methyl chloride, the company requested the Bureau of Mines to undertake such investigation at their Pittsburgh laboratories under Dr. R. R. Sayers and Mr. W. P. Yant. Such agreement was signed October 4, 1928, by representatives of the company and the bureau.

Absorption By Foods

In June, 1929, the bureau was requested by the company to undertake an extensive investigation of the absorption of methyl chloride by various classes of foodstuffs and their subsequent effect on animals. The bureau agreed on June 12, 1929, to conduct the investigation.

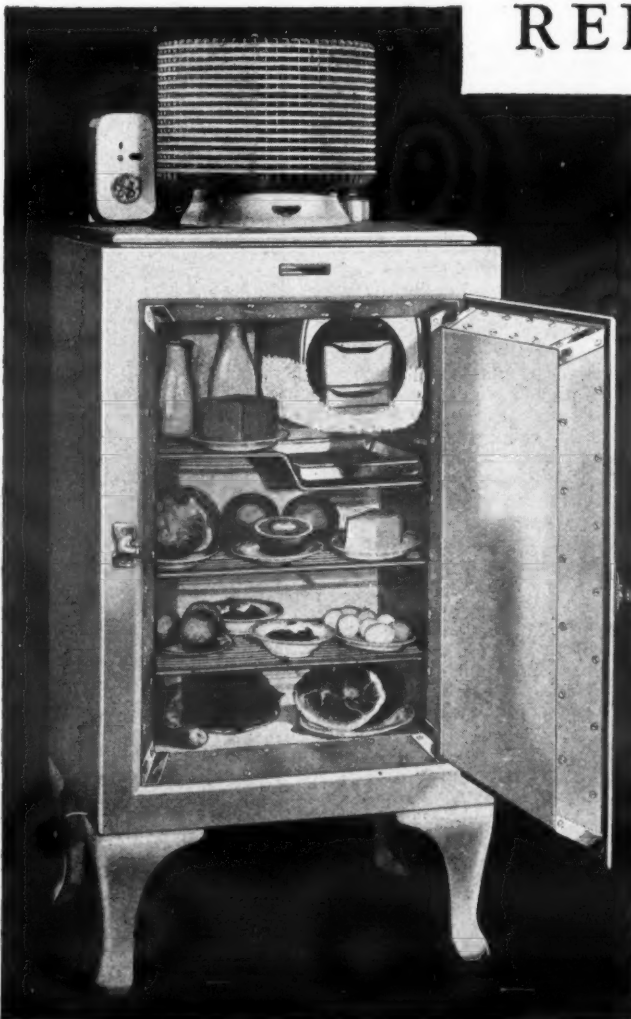
After much study and long experience in handling chlorine, hydrocyanic acid and such, the company has for some time taken the attitude as expressed in their pamphlet No. 274 on "Artic—The Refrigerant," issue of September, 1927, that:

"All gases, except pure air, are more or less toxic or asphyxiating, and breathing them is always to be avoided. Adequate ventilation should be provided wherever volatile liquids or gases are used."

In conclusion, I wish to state that with the proper installation of mechanical refrigeration equipment followed by proper inspection, employing any of the generally accepted refrigerants, there is no reason why such equipment cannot be made safe.

Trimmed with
MONEL METAL
screws and
angles . . .

GENERAL ELECTRIC
REFRIGERATORS



Model G-55 General Electric Refrigerator showing Monel Metal Corner Angles and Screws. All the screws holding the special odorless facings on door and jamb are Monel Metal.

THE General Electric trade mark on an electric refrigerator is akin to the sterling mark on silverware. It always stands for highest quality in every detail.

The specifications of the General Electric Refrigerator (model G-55) call for the use of corner angles and screws that will retain their strength, brightness, and polish where there is moisture, constant wear and general hard use. That's why General Electric uses Monel Metal.

Monel Metal combines silvery beauty with rust-immunity and corrosion-resistance. And back of these very important properties is another of equal value—**STRENGTH**. Monel Metal's strength is equal to that of steel.

Refrigerator manufacturers who are using Monel Metal for trim, screws, etc. are cashing in on the public appreciation of Monel Metal which has been built up through continuous color advertising in The Saturday Evening Post and Good Housekeeping.

Why not write us for more information about Monel Metal and a copy of our new booklet, "Monel Metal Enters the Home"?

Monel Metal is a technically controlled Nickel-Copper alloy of high Nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company, Inc. The name "Monel Metal" is a registered trade mark.

MONEL METAL

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

H. M. Williams Reports Tests Of SO₂ and Other Refrigerants

Frigidaire Engineer Testifies Before Special Committee of Chicago City Council

(Report Continued from Page 5)

Name and Occupation: Harry M. Williams, Chemical Engineer, Frigidaire Corp., Dayton, Ohio. Residence: 719 Belmont Park, North, Dayton, Ohio. Training and Degrees: B. S. and M. S., Otterbein College; Chemical Engineer, Ohio State University.

Experience: 1908-1917 Chemical Engineer, National Cash Register Co., Dayton, O. 1917-1919 Engineer tests, Remington Arms-Union Metallic Cartridge Co., Remington Arms Company plant, Bridgeport, Conn. 1919-1924 Research Chemical and Metallurgical Engineer, General Motors Research Corp., Dayton, Ohio. 1924 to date—Chemical Engineer, Frigidaire Corp., Dayton, Ohio.

I have active membership in the following National Technical Societies: American Chemical Society, American Electro-Chemical Society, American Society of Mining and Metallurgical Engineers, American Society for Testing Materials, American Welding Society, American Society for Steel Treating, American Foundrymen's Association, and the British Institute of Metals. I am also a member of the advisory committee to the United States Bureau of Standards, representing the American Electro-Chemical Society, and the American Foundrymen's Association.

General Motors Research

When the General Motors Corporation became interested in the subject of refrigeration, the matter was assigned for investigation to the Research Laboratories of the General Motors Research Corp. under the direction of C. F. Kettering. A comprehensive research was undertaken and conducted until a product was perfected and turned over for production.

In any research of this character, naturally, one of the most important problems consisted of the selection of a suitable refrigerant. This problem was carefully considered and a vast amount of research work was done by the General Motors Research Corp., and this work has been continued both by the Research Corp. and the Frigidaire Corp. In their estimation sulphur dioxide was deemed most suitable for our use. This decision was based on the following considerations:

Attributes of Sulphur Dioxide

1. Sulphur dioxide is non-inflammable, and will not support combustion.
2. It is a stable chemical compound, and does not break down under the conditions of use in our refrigeration systems.
3. Sulphur dioxide does not mix in all proportions with lubricating oils, and therefore does not present oil problems in connection with the lubrication of compressors.
4. Sulphur dioxide is suitable for all the various types of refrigeration equipment which we build and sell on the market. This includes both the expansion and flooded systems.
5. Sulphur dioxide is ideal from the standpoint of the detection and location of leaks. This is a very important matter from the standpoints of manufacture, installation and as a warning to a user of refrigerating equipment, in case of a leak. The escape of refrigerant can readily be detected by smell in concentrations as low as 10 to 12 parts in a million. The exact location of a leak can be determined by the simple use of a brush or small rag saturated with household ammonia. When the brush containing ammonia is brought near any leak in a machine, tube or coil, a white smoke is instantly formed which points out the exact location of the leak. This test is extremely sensitive and satisfactory.

Chief Disadvantage

6. From a manufacturing standpoint the chief disadvantage of sulphur dioxide is due to the fact that it combines with water or moisture, forming sulphurous acid, which attacks metals, particularly iron and steel. If a compression machine contains moisture, the sulphurous acid formed attacks the pistons and cylinder walls, forming a sulphate of iron, which is sticky and stops the compressor. In this case the refrigeration stops, and it is necessary to remove the compressor and replace it with a new one. While this interference with refrigeration is undesirable to the user, yet it is an advantage, in that it immediately shows the presence of even small traces of moisture in the refrigeration system, and refrigeration cannot be resumed until the moisture is eliminated. To offset this difficulty in the manufacturing process, it is necessary to absolutely eliminate moisture from all component parts of the system before charging with the refrigerant. This is done at great expense. Units are dried under at least 25" of vacuum in ovens heated to 200° to 225° F.

7. Sulphur dioxide can be readily obtained from reliable manufacturers in a high degree of purity. It is manufactured from pure sulphur and not from

smelter gases containing arsenic and other impurities. As received at our plants it is pure, dry and free from corrosive impurities. The moisture content based on large numbers of tests of shipments received is under 0.003%.

Quantities Handled

During the last few years very large quantities of sulphur dioxide have been charged into Frigidaire equipment. The refrigerant is received in one-ton drums. It is redistilled into ton containers, and each one of these is tested to make sure of the proper purity before being released to the charging boards. A record of the last few years shows that the quantities used are quite large. The usage was approximately as follows: 1926, 2,500,000; 1927, 3,000,000; 1928, 3,700,000.

Effect on Workmen

When it is considered that the sulphur dioxide is charged into small units, some of which receive only one or two pounds, it is readily seen that there is much handling and chance of the refrigerant gas escaping into the charging rooms. The effect of such leakage into the atmosphere of the rooms on the health of the workmen was the subject of considerable cooperative work with the Ohio Industrial Commission.

Daily tests were made at numerous locations in the charging rooms to determine the sulphur dioxide content of the air. It was found by tests that the average content was about 16 parts per million, although in certain instances and at times the concentration was higher. Following is a statement from our factory first aid physician, who has had direct intimate contact with all of our workmen over a period of more than five years.

Statement of Dr. M. M. Schaeffer

"This investigation conducted by the Industrial Commission of Ohio proved to their satisfaction that SO₂ as used in the manufacture of electric refrigerators (Frigidaire) does not cause industrial poisoning, and therefore was not added to the list of industrial poisons set down by that body. Only the acute irritations of the eyes and respiratory passages (due to liquid SO₂ and concentrated gas) were considered of any importance, and these are listed under the heading of accidents, as no permanent effects remain in the way of impaired health after the exposure.

"The workmen who have suffered accidents in which they were exposed to the liquid SO₂ and concentrated gas have no remaining symptoms of impaired health and after a short period of rest and treatment have returned to work. The only impairment or permanent damage in any way has been impaired vision resulting from SO₂ liquid in the eyes direct. This has not caused blindness in a single case, but has caused some of the men to wear glasses on account of the visual impairment.

Health Not Impaired

"After a period of five years, observation of employees who were constantly exposed to SO₂ in low concentration no impairment of health traceable to SO₂ has been found. During the influenza epidemic of the past winter a careful check was made concerning the susceptibility of the men working in SO₂ fumes constantly, as compared to that of other departments in which no SO₂ was present.

"It was found that men in SO₂ developed proportionately no greater number of cases than those working in other departments in which there were no fumes. Our only conclusion from an observation of that sort was that SO₂ did not weaken one after long exposure so as to make him more susceptible to ordinary diseases.

"During my five years experience around SO₂ we have had no deaths due to pneumonia in anyone who was working in SO₂ of low concentration over a long period of time. And we have had no deaths due to exposure to concentrated SO₂."

It is a well known fact that when relatively low concentrations of sulphur dioxide are inhaled the effect is to make normal breathing difficult or impossible and to induce spasmodic coughing. The result is that the individual immediately seeks fresh air, the reaction soon ceases, and the individual returns to normal with no after-effect, excepting possibly a slight temporary irritation. This effect is sufficient to awaken a sleeping person. Several instances have occurred where people have been thus aroused.

Experience With Methyl Chloride

The writer has had experience over the last three or four years with the use of methyl chloride in Frigidaire equipment. This refrigerant was redistilled through sulphuric acid before charging. The compressors and evaporator coils were dried in the same manner as is our customary practice when sulphur dioxide is used.

In all cases we found that we could not prevent methyl chloride leaking out, and the system would finally lose its charge and refrigeration cease. In some

cases as high as eight months were required for this loss of refrigerant.

This failure led us to experiment with methods for the detection of leaks where methyl chloride was used as a refrigerant.

Mixture of Two Refrigerants

The writer reasoned that if it is so easy to detect a sulphur dioxide leak that it might be possible to incorporate sulphur dioxide in the methyl chloride in sufficient quantity to add this advantage to the methyl chloride. Extensive studies were made and it was found that methyl chloride and sulphur dioxide mix in all proportions.

A decomposition test demonstrated that there was no chemical action between them, the resultant solution being similar to that formed by the mixing of such liquids as alcohol and water. It was further found that 8 to 10% of sulphur dioxide were required to give a noticeable test both as to smell and ammonia fumes. We then charged a number of our machines with the mixed refrigerant and have had them running in actual operation over three or four years, demonstrating that this is one practical solution to the difficulty of detecting methyl chloride leaks.

Conclusion

In conclusion the writer is of the opinion that if various kinds of refrigeration units are manufactured under suitable inspection and tests, are installed correctly mechanically, and if multiple systems are properly tested and safeguarded, then there is a minimum of danger to the public provided a suitable leak detector is incorporated in the refrigerant.

The fact that sulphur dioxide, even in very minute quantities, is so irritating that ordinarily a person cannot stay in an atmosphere containing the gas in sufficient concentration, makes the harmful effect of sulphur dioxide relatively remote.

Finally, in view of considerable experience with the mixing of sulphur dioxide with methyl chloride, the writer would suggest the use of this chemical as a detector or tracer of methyl chloride leaks.

Chicago Aldermen Question Chemists on New York Code

Essington Urges Councilmen To Set Standard for Nation

Chairman: Senator Essington, have you any further speaker?

Senator Essington: We have none which we intend to call at this time. We have manufacturers and engineers here to answer any questions which you might ask if you so desire. It is our intention at this time to present to the committee this ordinance of which I spoke and it would be my suggestion that it might be well for the committee to study these drafts, as we want to study them some more; and at that time the ordinance passed by the Health Department, or any other ordinance that might be presented, may be studied. It seems to me that the engineering features, construction features and mechanical features would perhaps best be discussed at that time, in order that we might analyze the situation. We are anxious to work the situation out with you as a national problem really more than a city problem. I suggest, as you told the committee, when we both have an opportunity to discuss the matter further we can do it frankly, freely, and candidly as has been done at all our meetings so far.

Alderman Sloan: Do you know whether or not the New York ordinance is a workable ordinance? My reason for asking this is simply that if that ordinance was workable and satisfactory, it might be well for us to adopt that self-same ordinance. If we could get set on one simple ordinance, I think everyone would be better off than if we sat down and thrashed out your ordinance, our ordinance, and a few others, and considered them each separately.

Chairman: I might say that the Health Department would not accept the New York ordinance.

Alderman Sloan: Wasn't there an ordinance or bill in the New York Legislature?

Senator Essington: That was not passed. I tell you very frankly there is pioneer work to be done and it has to be done right here.

Chairman: The chair has been somewhat of the same opinion as Senator Essington on the subject. Subject, of course, to the voice of the committee, possibly the best we could do would be to have this record written up and adjourn until some convenient date so both sides could study and agree to meet again and discuss the points we wish to discuss in this matter.

Alderman Ross: The Health Department has spoken—they will not accept the New York ordinance. Would your organization accept it?

Senator Essington: It would be hard for us to accept it or to reject it. We would not be satisfied at all. I am sure that we can work out a much better one.

Alderman Ross: An ordinance for Chicago alone is bound to affect the industry in various other parts of the country, New York, Los Angeles, etc.

Alderman Sloan: I am very anxious to hear something from the engineers. Most of this chemical stuff is over my head. Perhaps you doctors can understand all this and probably enjoy it, whereas I might know a little more about engineering than the doctors do.

(Concluded on Page 8)

10 LARGE RAILROADS CHOOSE LIPMAN

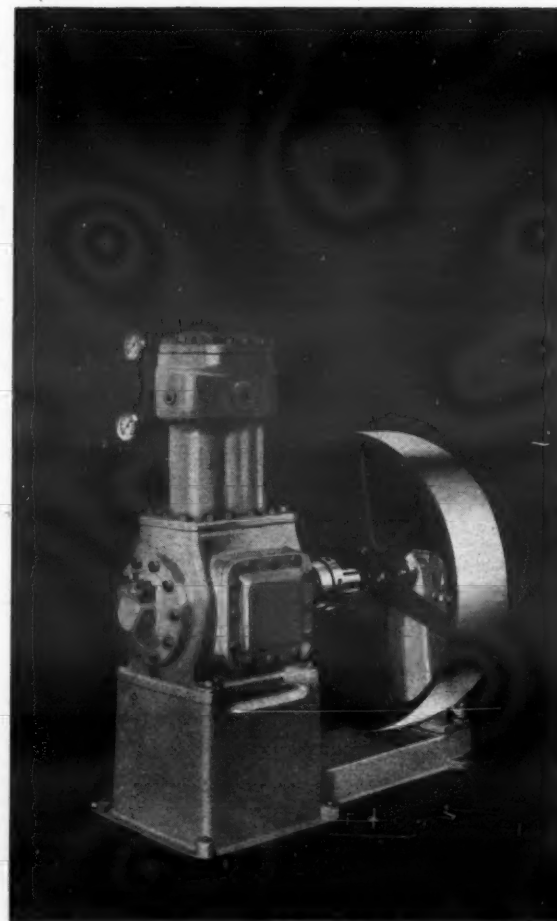
WHY?

Ten large railroads have recently purchased Lipman Electric Refrigeration. Interesting information, to be sure—but of what significance is it to prospective buyers of electric refrigeration or to men who are engaged in the business of selling such equipment.

Just this: These purchases were made by trained and fully informed purchasing departments. If refrigeration just as good were obtainable at a lower cost, Lipman would not have been chosen!

Its decidedly lower cost of ownership makes Lipman the choice of exacting purchasers who demand the utmost value for their money—and the choice of farseeing dealers who do not want their profits absorbed by "service" charges.

We invite the inquiries of well-rated distributors. Address the General Refrigeration Co., Beloit, Wisconsin. Write, wire or phone today! All negotiations strictly confidential.



...A SIZE FOR EVERY
COMMERCIAL PURPOSE

Lipman
ELECTRIC REFRIGERATION

KELVINATOR PROGRESS AND SUCCESS

SATISFYING DEALERS EVERYWHERE

The franchise most sought after today in electric refrigeration appears to be the Kelvinator franchise.

It has taken on a new value, and the highest value it has ever had, as demonstrated by the satisfaction of Kelvinator dealers and the new profits that are coming to them.

What is happening now was almost a foregone conclusion, in view of the recent Kelvinator progress and the resultant success.

The industry has known for months of the new Kelvinator administration. It has known of the new vigor and the sound and successful experience which make up the background of that administration.

But even with that knowledge, and with the certainty of Kelvi-



Traditional Kelvinator quality. The silent, reliable Kelvinator mechanism is located in cabinet case, Porcelain interior. Heavy Parkerized furniture steel cabinet. Proper cold maintained by automatic control. Automatic quick freezing of desserts, ice cubes. A constant reservoir of cold minimizes operating period and running costs. Flexible rubber ice tray ejects ice cubes in a flash. Food capacity including defrosting tray, 4.23 cubic feet, with 8.87 square feet of shelf area.

nator's sound position, dealers preferred to wait for evidence in the shape of tangible results.

Those results are now visible on every hand, in the flood of new public interest in Kelvinator and the new public buying of it, climaxed July 12, with the largest single day's receipt of orders in Kelvinator history; as well as in Kelvinator's own recent achievements.

The latest of these, of course, is the new Kelvinator Four at a list price of \$175 f.o.b. Detroit, for which the public demand is taxing the production of the factory, following the new precision-built quiet compressor.

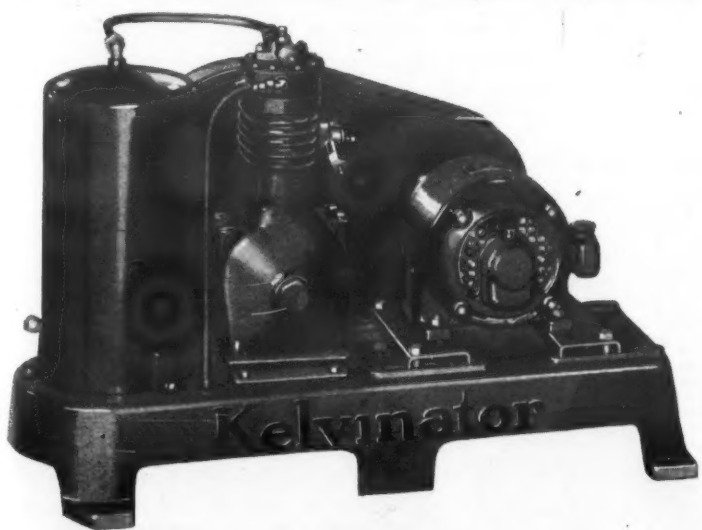
Before that, in the commercial lines, came the new heavy duty compressors with water-cooled head; and also the cross-fin coil for commercial use.

Any dealer who is posted at all on the developments in electric refrigeration will realize the new sales opportunities which these new Kelvinator advancements open up, in both the domestic and commercial fields.

That is made evident to us by the number and the calibre of the dealers who are taking on the Kelvinator franchise and applying for it.

Without question, Kelvinator offers the liveliest opportunity in electric refrigeration today and for a long time to come.

Without question, the liveliest dealers will want to line up now with Kelvinator.



Model WR-40

1 H. P. water-cooled unit with water-cooled compressor head. Specially designed to meet needs of large commercial installations such as cold rooms, walk-in refrigerators and multiple apartment house installation.

Made in 3 Sizes



Kelvinator Model 72X Cross-Fin Cooling Unit
For Display Cases

Dimensions: 6½" wide—72¼" long—5½" high

Made in 5 Sizes



Kelvinator Model 66XD Cross-Fin
Cooling Unit

For Large Commercial Refrigerators

CAPACITY EQUIVALENT TO 70 TONS ICE MELTING EFFECT
per year

Dimensions: 16½" wide—65½" long—5½" high

KELVINATOR CORPORATION

DETROIT, MICHIGAN

Glen Muffy Discusses Past Efforts to Develop a Code

(Statement Before Special Committee of Chicago City Council, July 11)

Senator Essington: I will call on Mr. Glenn Muffy.

Mr. Muffy states that he is consulting engineer for the Copeland Products Company, Inc., Detroit, Mich., and that mail will reach him at that address. He further remarks: I have no prepared paper to read. I am not going to recite any long list of qualifications—I don't have as many as some of the gentlemen who have preceded me. I have been picked on as more or less of a neutral engineer, since the company by which I am employed uses two of the refrigerants, methyl chloride and isobutane, and a subsidiary company of ours uses sulphur dioxide.

I believe I should correct a little statement I made. I don't want to get anything into the record that is misleading. I would not say that the New York ordinance is going without enforcement. There are some provisions in it which have not been enforced but the New York ordinance is technically in force. We do not like it.

The group of engineers who are here today has worked together in committees of the American Society of Refrigeration Engineers and the National Electrical Manufacturers' Association, of which technical committee I happen to be the chairman, and the other members are mostly here. You understand that engineers don't always agree. One says sulphur dioxide is the best refrigerant and another says methyl chloride—they both believe what they say and they are all honest. We engineers mostly agree that all of these refrigerants are safe when properly used, that there is no refrigerant that is safe if improperly used. You can even have accidents with air.

Now, the principles of operation of a refrigerating machine you may look upon as a pump. A refrigerating machine is nothing more or less than a pump which would be an air pump to pump up your tires if it did not hook into a system of pipes that had something else in it. This pump is used to pump heat units up here on a thermometer scale. We take some heat units out of a cold place and deliver them into a warm place—we do that with a pump. This pump is usually driven by an electric motor, hence we call it the electric refrigerator. There are other types of refrigeration machines that do not use an electrically driven pump, but they have the equivalent of it, so we invented the term "Pressure Imposing Element" and our stenographer abbreviated it to "P. I. E."

Service Men Trained

All of our companies operate several schools. They bring the men in from the field and train them; and send them back knowing how to service the machines. All of these service stations have night telephone numbers, and we request that these be posted alongside of the refrigerator. The reason for this is not so much for hazard of life in the matter of accident, but it is very important that food be kept cold, and when the refrigerator fails to do this, it is important to get the service man there quickly. More people can be killed by improper care of food than by accidental bursting of pipes and escaping of refrigerant.

I don't want to lecture—I am at your service. We have not quite come to fist fights but we have argued very strenuously about this problem. Now, we have added some special precautions which have not been in previous codes and which do not appear in the original ordinance suggested for Chicago. There is no national code. If Chicago takes the move first, they will have the honor of being the first city to adopt a national code. They will be copied the country over. The New York code has no chance whatever of ever being nationally adopted.

The American Standards Association with a large number of members, including the government bureau in Washington, has been working for months, years, in fact, to get an ideal refrigerant code. That code is now almost right. It does not quite suit everybody. Part of it was omitted, and owing to that omission, the National Board of Fire Underwriters, through the assistance of the Underwriters' Laboratory here in Chicago, formulated a code to cover a part which is not covered by the present Association code. We engineers have been called in so frequently that it interferes with our business of designing machines. The nearest we come to a 100 per cent agreement is to say to take the American Standards Association code, which is now in effect in some cities. Mr. Smithson, will give a list of these cities?

Code in Effect

Mr. Smithson: White Plains, New York, Detroit, the State of Kentucky and Memphis, Tennessee.

Mr. Muffy: Now, the National Electrical Manufacturers' Association has a refrigeration division, and that division has appointed a technical committee to iron this out; and that was the job that was wished on me as chairman of that committee. We are trying in Washington to take the two codes and put them together and satisfy the two bodies, and

we have been working on that real hard; and we take this opportunity in coming to Chicago to take these two codes and present them to you to put together.

Chairman: That is the copy we just received.

Mr. Muffy: That includes the health feature and the American Standards' Association and Underwriters' code to our best ability. We are unanimous in the opinion that that is the nearest we have to what a code should be.

Senator Essington: This ordinance as suggested includes not only the health, but also the construction and installation features.

Alderman Sloan: Are accidents resulting from the escape of the refrigerant due to faulty installation?

Mr. Muffy: Yes. Of course, we don't know in all cases, but in those cases where we have not facts, we believe it is due to some fault of installation.

Aldermen Ask Questions

Alderman Ross: You talk about the manufacture and the installation. Is it not true that the use of these machines will, through natural wear and tear, present hazards in time?

Mr. Muffy: The things that might happen as a result of time would be twofold. You might have a mechanical failure due to a wearing part, that is, due to a piston wearing out or bearings—you don't get enough refrigeration. The other type would be such as a building moving or settling down and damaging the pipes. We have provided against that by having these pipes protected by conduit wherever they come in an aisle or any place where they could be struck.

Alderman Ross: Repairs on these refrigerators might be made by inexperienced people—that is a hazard, is it not? Is there any provision on the part of the company to provide for periodic inspection?

Mr. Muffy: Some of them do. The companies by agreement have not set up any regular rule, however.

Alderman Sloan: You, as an engineer, figure that would be important from a health standpoint?

Mr. Muffy: I don't believe it would be very serious from a health standpoint. I believe the manufacturer would do that to protect his good name as a manufacturer.

Alderman Ross: We are talking about making the law. I am asking him from an engineering standpoint whether we should provide for that.

Mr. Muffy: I don't see any particular thing that the inspector would be apt to do about it. The things that might happen would be wearing out of the mechanism, the corrosion of a pipe, he change or settling of a building and breakage of a joint or someone moving the refrigerator.

Kegel Cross-Examined

Alderman Ross: May I ask Dr. Kegel a question at this point? In your investigation up to date has the present mortality been due to defects in installation or natural result of use?

Dr. Kegel: Both.

Alderman Ross: Therefore, in your ordinance is there any provision for a periodic inspection?

Dr. Kegel: Annually.

Alderman Taylor: I would like to know whether or not they are installing multiple systems in New York at the present time, using methyl chloride.

Mr. Muffy: No multiple systems are allowed in New York proper.

Alderman Ross: I understand at the present time they are prohibited from doing so in Chicago. Is that so?

Dr. Kegel: There is no ordinance to that effect.

Chairman: A statement was made by a representative of the Boiler Department that they had stopped issuing permits.

Mr. Gearon, Department for the Inspection of Steam Boilers: At the time this death was caused by methyl chloride, Mr. Nye, the chief inspector of the Department, issued an order that until further notice we would issue no more permits for the installation of refrigerating plants using methyl chloride under direct expansion.

Alderman Sloan: Has this code been officially adopted by the American Standards' Association?

Mr. Muffy: This has not been officially adopted. It is prepared by the members of the committee.

Chairman: It is a suggestion from you to help us to arrive at a conclusion.

Alderman Taylor: What type of joint do you provide?

Mr. Muffy: We provide different types of joints.

Dr. McNally: Has this committee ever reported an accident occurring where a single unit has been used in a home from methyl chloride or sulphur dioxide, that is, either a case of illness or a death? All of the systems we inspected or where we had cases of illness or death were where multiple units had been used and it would help this committee in framing an ordinance if you have any reliable information showing single units had never caused a death.

Mr. Muffy: The deaths are so few that we could only determine that there

was one official coroner's verdict. Someone said there was a half-dozen on record. In fact, I do not personally know of any death happening from an individual unit poisoning or asphyxiation. That does not present an average or percentage. There have been accidents due to individual units. They need some regulation, but as you go down in the size of the machine, naturally the hazard is also lessened. We have provided in this proposed code that when you get the machine so small as to require only two pounds of refrigerant, only slight restriction is necessary, but as you go up the restriction gets more and more severe and we have particularly in mind the one-room apartment where the bedroom and kitchen are in one room. In this case the restrictions are very strict. In a larger building where the kitchen is separated from the rest of the house, the hazard is very small. These accidents occur where you have one-room apartments—they are so small. These should be restricted.

Dr. McNally: Even on a single unit? Mr. Muffy: Yes. You would not need a very large amount of gas to compress liquid.

Alderman Taylor: Your ordinance has not stated whether your inspection should be under the Health Department or—(interruption).

Chairman: I think we understand that we have to iron out our own domestic situation after we get the big principles outlined.

Senator Essington: I you will allow us to help and sit in and advise in drafting of the ordinance, we will promise not to interfere.

Mr. Muffy: I might say that if I seem in my remarks to have borne heavily on other ordinances and gone lightly over the requirements of the Chicago ordinance, it is only because this bunch of men has worked for months on the matter and we know these clauses by heart.

Chairman: Senator Essington, have you any other engineer or anyone else to call on?

Senator Essington: That concludes our offering of the day.

Chairman: Are there any further questions to be asked or shall they be reserved until (interrupted by Senator Essington).

Senator Essington: I suggest that we meet again.

Chairman: Just let the records show that the representatives of the industries have submitted a model code covering health, installation and inspection features and construction features, as well. The question is as to our next meeting.

Alderman Taylor: I wish to say that although the council adjourned yesterday until September 10, it was done with the understanding that they would call a special meeting to help with this, if necessary.

Senator Essington: We are not anxious for undue delay.

Alderman Taylor: We would have the ordinance long before September 10th?

Chairman: I assume the industries would appreciate our getting through this as expeditiously as possible. I assume the Health Department feels the same.

Senator Essington: I ask that we be given notice, if you please, in time to get these men here.

Next Session Announced

Chairman: Would you say two weeks from now? Is Thursday, the 25th of July, an acceptable date?

Dr. Kegel: May I suggest that a small committee of the industry and one or two of the aldermen get together with the Health Department on these two ordinances that have been submitted and work out the various features as much as they possibly can? I believe that would expedite matters considerably.

Chairman: As you well realize, the aldermen are pretty well over their heads in this problem now and we have to act as impartial judges. Would it not be better (I merely make this as a suggestion) that possibly a committee from the industries get together with the Health Department and iron out the matter and

if you can't iron it out, we will have to decide it; and if you agree, we will see if we cannot agree with you. I think it is a pretty big undertaking for general discussion.

Alderman Ross: Why can't we get together at the same time so we won't be "in the dark?"

Senator Essington: What we are asking for now that this has been precipitated is this: these various men have been sitting around here since Tuesday and would like to go back to their home offices—go over it with them and then come back with a little more information. At the present time most of them do not care to take the responsibility of voicing the opinions of their various companies without further consultation.

Alderman Taylor: In drawing up this ordinance, did they have a copy of the proposed ordinance submitted by the Health Department?

Chairman: We just went to them with our suggestion and they came back with their counter-suggestions and we have to study what they think about it.

Senator Essington: In the same spirit that Dr. Kegel said he did not present that ordinance as the last word on the subject.

Chairman: Now let both sides have a little time to think it over.

Senator Essington: We will speed it up as much as possible from our end.

Chairman: Does two weeks seem too long?

Senator Essington: I think two weeks is about as soon as we can meet.

Chairman: We will accept it, then, that we will adjourn at this time until July 25 at 2:00 p. m., in this room, each side present to make further suggestions for making harmonious approval.

Dr. Kegel: We just wish to say this: that it might be well if a small committee of two or three aldermen and one or two engineers or chemists can stay over for a few days. We can work on this tonight or tomorrow.

Chairman: You gentlemen informally agree on that, then? The meeting stands adjourned.

In Between

the 2 Big Markets

Household and Industrial

DoleCo

REFRIGERATION

BETWEEN the Household and Industrial Markets there is an immense field for commercial refrigeration. Drug stores, markets, restaurants and many other lines of business, are confronted with refrigeration problems that can be solved only with equipment designed to meet the requirements of each individual case.

DoleCo Units are built in eight sizes, with capacities from 250 to 4000 pounds. They require a surprisingly small amount of space. Ammonia, used as a refrigerant, insures highest efficiency at lowest operating cost. DoleCo equipment has a well earned reputation for freedom from service and repairs.

Our Dealers Tell Us:

"All DoleCo Refrigerating Machines in Detroit are giving perfect satisfaction and I look for an increase in sales for the balance of 1929."

(Signed) F. A. Mainville,
1547 Gratiot Avenue,
Detroit, Michigan.

"Realizing the higher efficiency of ammonia as a refrigerant, we investigated the market for a machine employing it and decided upon the DoleCo Machine as being the product of an experienced refrigeration engineer. We have not been disappointed in our choice."

(Signed) A. M. Fenwick Co.,
610 N. Union Street,
Fostoria, Ohio.

"Among the small machines, the DoleCo has proven the equal of any in our twenty-five years' experience. We have not one dissatisfied user."

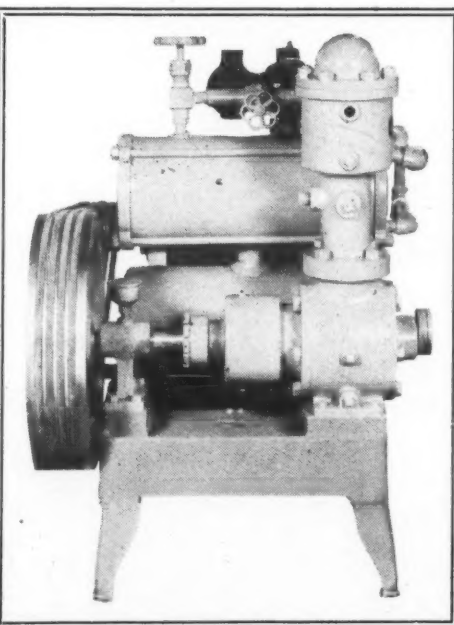
(Signed) George B. Williams,
12 Central Wharf,
Portland, Maine.

"We have had extra fine results, and are proud of the fact that we are representatives of the DoleCo line."

(Signed) The R. M. Flagg Company,
197 Exchange Street,
Bangor, Maine.

Valuable franchises are still available in territories where we are not represented. We wish to communicate with aggressive dealers having sales organizations experienced either in refrigeration or similar lines. For them we have an excellent proposition.

Dole Refrigeration Machine Co.
1209 W. Washington Boulevard
Chicago, Illinois



Single Cylinder



A few of the 231 fine modern apartment houses in Metropolitan New York that have chosen Electrolux, the Gas Refrigerator, within the past seven months. Read what prominent architects and builders have to say about the absolute silence, dependability, and low operating cost of the Electrolux Refrigerator.

Metropolitan NEW YORK

*"is still going
ELECTROLUX"*

*During May and June 77 fine new apartments were equipped
with 5,535 new Electrolux Refrigerators*

FIRST offered for sale at the end of 1926—today in tens of thousands of homes the country over. That, briefly, outlines the tremendous success of Electrolux, the Gas Refrigerator.

A success not confined to any one section of the country, to any one city or group of cities. Even in the Metropolitan New York district—long noted for its keen competition, and always looked upon as the world's hardest place in which to introduce a new product—the record of Electrolux has been phenomenal. In this one territory, in just one field alone—that of better-class new apartment houses—Electrolux within nine short months has been chosen as standard equipment in 231 new buildings—requiring a total of 17,077 refrigerators.

A sensational success, but not surprising to those who have followed the development of the Gas Refrigerator. Not a single moving part. No motor. No machinery. Nothing but a tiny gas flame to vaporize a refrigerating liquid and a mere

trickle of water to condense it back again. The result—intense, even cold, plenty of pure sparkling ice cubes, but never a whisper of sound, never any trouble, and all this at the lowest cost in history.

For six years it was tested, improved and refined; tried out under practical operating conditions. It was investigated thoroughly by scientists, engineers, refrigerating men. It was tested for months by nationally known authorities such as Good Housekeeping Institute,

Delineator, New York Herald Tribune, National Board of Fire Underwriters—and approved by all.

Architects and builders, too, men who buy only on the basis of cold facts, examined Electrolux carefully . . . and became enthusiastic.

Mr. Victor C. Farrar, of Farrar & Watmough, for instance, an architect of over twenty years' standing who has designed some of New York's noted buildings, has this to say:

"Electrolux, a comparative newcomer in the field, is the most interesting and remarkable development of all. The substitution of a silent little gas flame for all other operating mechanism is a great achievement. From the building owner's standpoint, it means greater length of life and freedom from service. From the woman's standpoint it means simplified, dependable, trouble-free operation, at a lower cost than ever before."

Or among the builders, take the opinion of Mr. J. Irving Walsh. His firm, J. Irving Walsh, Inc., develops better-class apartment properties in the fashionable Washington Square and lower Fifth Avenue section of New York. He says:

"Every successful builder in the apartment house field tries to use



QUICK FACTS

No sound
No moving parts
No oiling—No trouble
Costs less to operate
Lasts indefinitely
No wear



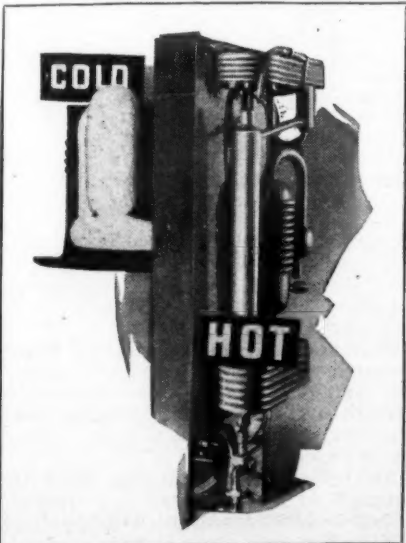
Constant noiseless cold, pure sparkling ice cubes at all times



Right—Mr. Victor C. Farrar, of Farrar & Watmough, architects for the well known Henry Mandel Companies, whose opinion of Electrolux appears on this page.



Left—Mr. J. Irving Walsh, prominent builder, formerly President of the New York Real Estate Board, and a director of the New York Real Estate Exchange, Inc. Read his statement.



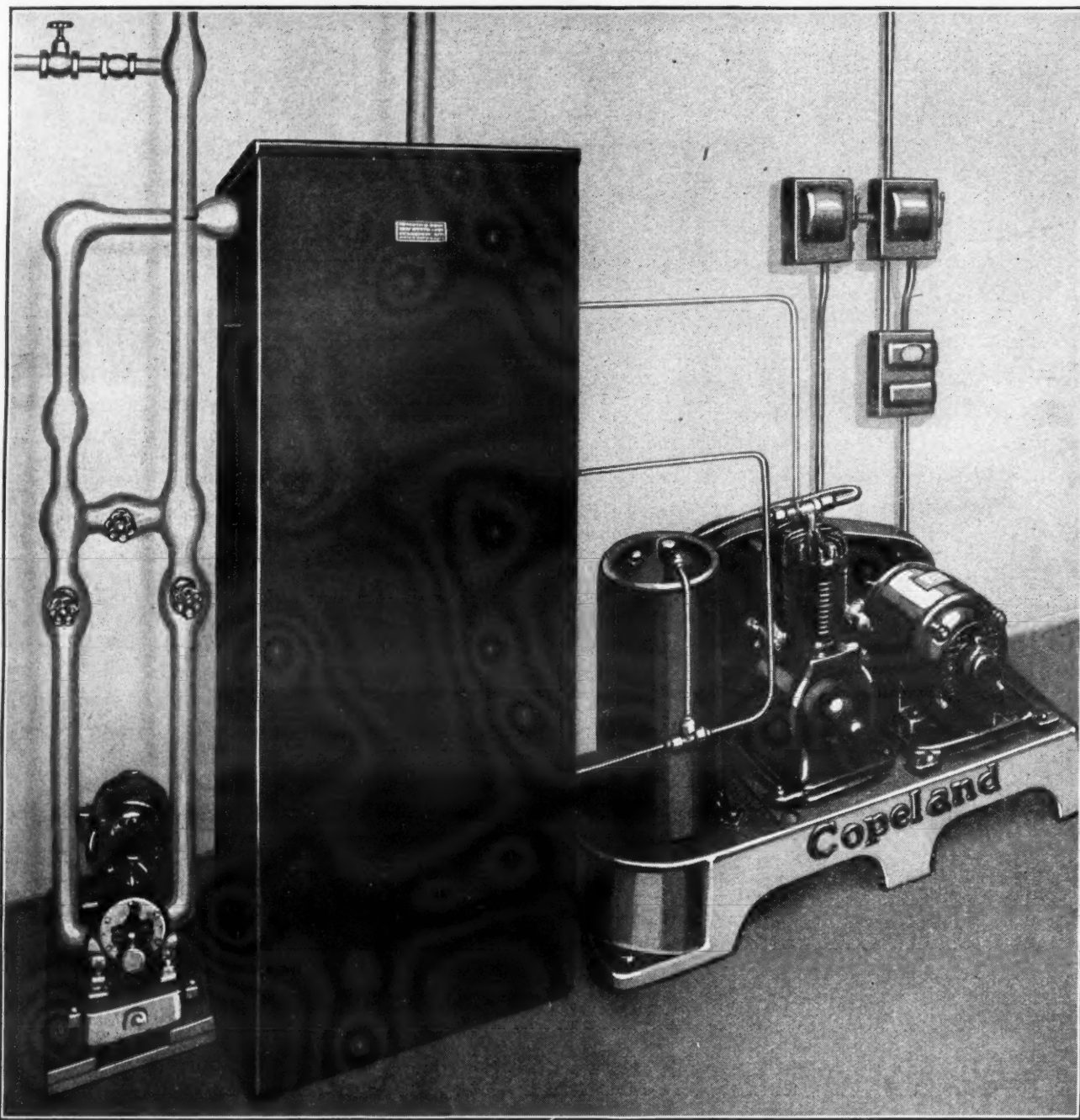
Picture at right shows the "whole works" of Electrolux—a series of steel tubes hermetically welded into one solid continuous unit. No machinery, not a single moving part to vibrate, to make noise, to cause trouble.

equipment that will best provide for the comfort and happiness of tenants, and at the same time keep down future maintenance costs. Electrolux, the Gas Refrigerator, meets this qualification. I have had a long experience with automatic refrigeration, but I like Electrolux and use it because I find it is absolutely noiseless, and in the kitchen you can not only depend upon it to operate perfectly, but at far lower cost than

any other refrigerating system."

That is the story of Electrolux. Only one thing remains. If you are interested in the substantial profit opportunity which Electrolux offers able merchandisers, wire or write at once for complete details as to models, prices and territories. In some sections it is still possible for dealers to obtain a franchise if able to meet our qualifications. Address Servel Sales, Inc., Evansville, Indiana.

Announcing Copeland-Spear Ice Water Generators



ARRANGEMENTS were recently completed whereby the famous Spear Ice Water Generator is to be marketed exclusively in combination with Copeland dependable electric refrigeration.

Spear Ice Water Generators operate on the principle of pressure storage—sponsored by the foremost electrical refrigeration engineers in the country and proved successful by years of service. Water is cooled by contact with ice; normal capacities are from 6 to 60 gallons per hour, peak demand capacities from 30 to 400 gallons over 2-hour period; short cycles of starting and stopping are eliminated, thus saving compressor motor.

Non-circulating systems handle as many as three outlets with maximum length of pipe. One-pipe circulating systems for apartment, commercial or industrial use feature simplified installation and in some cases effect a saving of 40%.

Bakeries, hotels, office buildings, clubs, theatres, railroad stations, hospitals, factories, etc., are supplied with ice water more dependably and at lower cost because of the Copeland-Spear combination.

And dealers are supplied with nationally-known, easy-selling merchandise with which to satisfy any and all requirements in the commercial and industrial water cooler fields. Complete details of Copeland's latest profit-making proposition are now ready.

COPELAND SALES CO., 630 LYCASTE AVENUE, DETROIT

Copeland

DEPENDABLE ELECTRIC REFRIGERATION

Food Preservation Program Gets Official Endorsement

(Concluded from page 1, column 1)

the campaign by the executives and personnel of the Mohawk Hudson organization, who will cooperate in every possible way with the plans laid out by the national organization.

G. C. Neff, of the Wisconsin Power & Light Co., city chairman for Madison, has ordered 70,000 booklets, 35,000 thermometers 500 truck cards and 25 sets of food preservation talks to assist in putting over the activity in that territory. District No. 10 in the South, under the direction of C. A. Collier, of Atlanta, is getting away to a rapid start. R. I. Brown, regional director No. 12, is getting Arkansas completely organized and will be ready for active operations in a short time. G. E. Buck, regional director No. 16, is concentrating his efforts in the city of Denver.

The Food Preservation Program was well represented at the convention of the American Medical Association, which was held at Portland, Ore., July 8-12. Literature regarding the national activity was distributed from the refrigerator displays, which also featured the food preservation movement.

The General Federation of Women's Clubs has endorsed the program. Other recent national endorsements include: the Bureau of Home Economics, United

the United States of representatives of all industries engaged in making and marketing refrigeration and perishable foods. Formulate idea contest plans. Make out budget and requisition materials.

July 15—Meeting of public health associations, medical associations, federations of women's clubs, etc., with local executive committee to work out plans for local observance. Appointment of sub-committees to arrange details. Announce contest plans, judges, etc. in local press.

August 1—Meetings of women's committees of utilities to plan for and discuss means for increasing effectiveness of observance.

August 10—Full page color advertisement to appear in *Cosmopolitan* dated September.

August 12—Meeting of entire executive committee with representatives of co-operating organizations for purposes of final check up on arrangements and to instill enthusiasm in all.

August 15—Posters to go on the boards. August 15—The folder "How to Safeguard Your Family's Health" to be sent by participating companies with monthly bills.

August 20—Full page color advertisement to appear in *Women's Home Companion* dated September.

August 20—National Radio Broadcast over stations controlled by interests concerned.

August 24—Double-page, 2 color spread to appear in *Good Housekeeping* dated September.

August 26—Meetings of employees and public.

August 27—National Radio Broadcast.

August 29—Double-page, 2 color spread to appear in *Saturday Evening Post* dated August 31st.

August 29—First newspaper advertisement to appear. Publicity stories.

August 30—Full page color advertisement to appear in *Collier's* dated September 7th.

August 30—Publicity story on contest.

August 31—Full page color advertisement to appear in September *Pictorial Review* and September 7th *Liberty*.

September 2—Decorate all trucks.

September 2—Local Radio Broadcasts over stations locally controlled.

September 2—Second newspaper advertisement appears. Publicity stories.

September 5—Third newspaper advertisement appears.

September 9—Fourth newspaper advertisement appears. Publicity stories.

September 9—Local Radio Broadcast over stations locally controlled.

September 12—Double-page, 2 color spread to appear in *Saturday Evening Post* dated September 14th.

September 12—Fifth newspaper advertisement. Publicity stories.

September 14—Open House receptions.

September 14—Publicity follow-up story on contest.

September 16—Sixth newspaper advertisement.

September 23—Seventh newspaper advertisement. Publicity stories.

September 30—Eighth and final newspaper advertisement.

September 30—Newspaper stories on success of the program.

September 30—Contest closes.

October 7—Meeting of executive committee to prepare report to be sent at once to the National Food Preservation Council.

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United States Department of
Agriculture
Bureau of Home Economics
Washington, D. C.
June 6, 1929.

Leland P. Bannister,
Refrigeration Division,
National Electrical Manufacturers
Association,
420 Lexington Ave.,
New York, City.

The Bureau of Home Economics
will be very glad to cooperate with
the various interests in the preparation
of material for the Food
Council program. We shall be very
glad to have our name used in
connection with the program for
this week.

LOUISE STANLEY,
Chief.

States Department of Agriculture; Royal
C. Copeland, U. S. Senator and nationally
known health authority; the National
Dairy Council and the American Institute
of Refrigeration.

To strengthen the authenticity of the
basic food preservation principle, that 50
degrees or less is necessary for proper
preservation of perishable foods, the
committee has gathered the following
quotations from governmental authorities:
Bulletin 98—United States Department
of Agriculture—"At a temperature below
50 degrees Fahrenheit, bacteria multiply
less rapidly, but between 50 degrees and
100 degrees Fahrenheit the increase is
very fast; hence the necessity for thorough
cooling and maintenance of low
temperature until used."

Bulletin 744—United States Department
of Agriculture—"Milk must be kept at a
low temperature (50 degrees Fahrenheit
or below) from the time it is produced
until it is consumed, if its quality is to be
maintained."

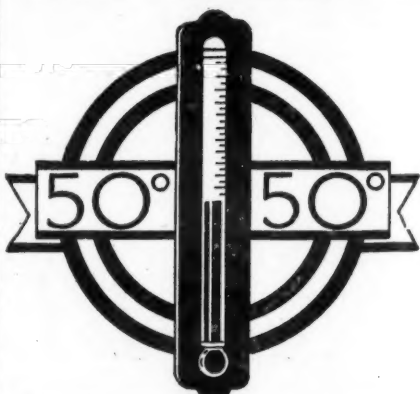


Milk Bottle With Jacket Carrying Brief
Food Preservation Message

Public Health Leaflet No. 1—Department
of Health, New York City—"To prevent
decomposition of milk, even though
sterilized, it must be kept cool, at or
below 50 degrees Fahrenheit."

Farmers' Bulletin 375—United States
Department of Agriculture—"The different
varieties of mold are everywhere
present, and they need only warmth and
moisture to enable them to grow on many
kinds of food."

The schedule of operations under the
program as it now stands is as follows:
July 1—Meetings in cities and towns of



Fifty Degree Symbol of the National
Food Preservation Program

tisement appears. Publicity stories.

September 5—Third newspaper advertisement appears.

September 9—Fourth newspaper advertisement appears. Publicity stories.

September 9—Local Radio Broadcast over stations locally controlled.

September 12—Double-page, 2 color spread to appear in *Saturday Evening Post* dated September 14th.

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SERVEL, INC., REPORTS LARGE GAIN IN SALES FOR FIRST 6 MONTHS

(Concluded from page 1, column 4)

000 in excess of the five months' net income of \$523,692. A net income of \$700,000 for the first six months of the current year would be equal after preferred dividends to about 45c a share on the 1,500,000 shares of common stock outstanding and would compare with a net income for the entire year 1928 of \$236,398, equal to \$5.52 a share on the \$7 preferred stock.

The following table gives the sales for the first six months of 1929 with comparisons:

January	\$ 663,902	\$ 287,224	\$376,678
February	948,402	359,986	588,416
March	1,418,810	596,632	822,178
April	1,763,734	815,007	948,727
May	1,462,511	1,242,405	220,108
June	*1,500,000	1,306,312	193,688

*Estimated.

The steady increase in sales of Servel reflects the efforts of the management to regain the goodwill and business of the customers and dealers of the old company. During 1928 the company expended more than \$190,000 for the repair and replacement of unsatisfactory cabinets of Servel Corporation, the predecessor company. In addition to this the company has been successful to a large extent in establishing many new dealer outlets, which have also been of benefit in increasing sales. Further distribution of its products is obtained through Servel's connections with various electric light and power companies.

Early in 1928, when volume production was commenced on Electrolux, the gas refrigerator marketed by Servel, the company placed on the market one model. By the end of the year six additional models were available, with the result that by Dec. 31, 1928, sales for the year totaled 20,000 refrigerators. It is understood that at the present time production of Electrolux is being maintained at better than the 60,000 schedule set and that sales for the full 1929 year will exceed this figure. In 1930 the company will double the production schedule of the current year.

In addition to its refrigerator business Servel, Inc., also manufactures automobile bodies for commercial use and distributes them through its subsidiary, Hercules Products, Inc. While the major portion of the output of commercial bodies is of the Chevrolet and Whippet type, the company anticipates a good volume of business from the Ford company when the latter resumes production of commercial cars. Hercules recently closed a contract with the Hudson Motor Company to supply its commercial bodies exclusively. Indications are that results for the 1929 year of this subsidiary will be at least 50 per cent better than for 1928.

The company is in a strong current position. The balance sheet as of Dec. 31, 1928, showed cash alone to be five times the total of current liabilities. The New York Stock Exchange is expected to take action on the application to list Servel shares on the big board again in the near future.

WOOD COMMENDS NEWS ON A. S. R. E. REPORT

The American Society of Refrigerating Engineers

37 West 39th St., New York, N. Y.
July 9, 1929

Electric Refrigeration News,
Detroit, Michigan.

I have just read over with a great deal of interest the splendid report which you gave in your last issue to the summer meeting at State College. It is a great satisfaction to have such a complete and discriminating statement of the doings at that time. We appreciate the advantage to the Society and to the College in the wide publicity which comes from an article in your publication.

A. J. WOOD,
President.

COMMERCIAL SALES OFFER BIG PROFITS DECLARES FERNALD

(Concluded from page 1, column 1)

engaged in the business of selling refrigeration equipment.

The addition of a commercial department simply requires a little additional training of experienced sales and service men and an investment of added working capital sufficient to cover a commercial refrigeration stock for a period of about sixty days.



J. M. Fernald

The present method of time payment used on commercial sales makes it possible for the user to purchase his equipment and make his payments in monthly sums which amount to less, in many cases, than he previously paid for ordinary refrigeration.

Approved applications of commercial refrigeration are now being made to meet the majority of the requirements of more than a hundred different classes of business in which refrigeration is required. The inducement to put in electric refrigeration with its added advantages is obvious, says Mr. Fernald.

WILLIAMS OIL-O-MATIC DEALERS PAY OWN WAY TO ANNUAL CONVENTION

Believe it or not, dealers come from all over the world to the factory convention of the Williams Oil-O-Matic Heating Corp. of Bloomfield, Ill., and pay their own expenses. For four years this feat has been accomplished, and each convention has been larger than the preceding one, according to J. A. Worsham, who tells the story in the July 4 *Printer's Ink*.

At the 1928 International Oil-O-Matic convention 2,812 was the attendance figure. Except for the four banquets served by the company, each guest paid all of his expenses.

The trick is worked by an intensive selling campaign previous to the convention, and by making each convention so valuable and interesting that those attending return the next year and bring others with them. An average of 90 per cent of those attending previous conventions come back regularly.

Enthusiasm is aroused among dealers before each convention by personal letters, direct mail advertising, and by Williams house organ, *The Oil-O-Matic News*. Traveling Oil-O-Matic service men also help to spread the news. A few days before the convention telegrams are dispatched to dealers who are not already registered.

Dealers are sold on the idea of attending in order to get new merchandising ideas, and the point is stressed that the sale of one extra oil-burner will defray the expenses of the trip. Schools of instruction, speakers who are recognized authorities in selling, advertising programs, and idea propagation are all carried on so efficiently in each convention that dealers get the habit of attending each year.

RATE SCHEDULE IN NEW YORK RECOGNIZES USE OF CURRENT FOR ELECTRIC REFRIGERATION

Rates favoring electric refrigeration by cutting the cost of current used in part of the Borough of the Bronx, New York City became effective July 1, 1929. Approval by the New York State Public Service Commission of a revision in the rate schedule of the Bronx Gas & Electric Corp. is one of the first examples of recognition by the State of a rate schedule for electric current used in refrigeration.

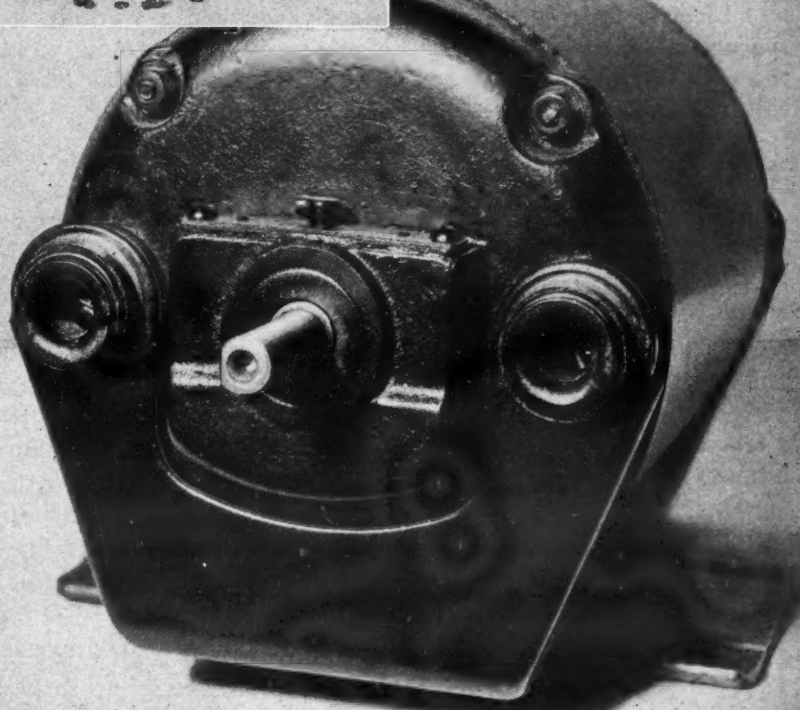
The revision applies to power used for charging storage batteries or for the operation of refrigeration machinery. The rate is changed from straight 5c per kw.-hr. to 5c per kw.-hr. for the first 2500, 4.5c per kw.-hr. for the next 2500, and 4c for each kw.-hr. over 5000 per meter per month, with a minimum charge of \$3.00 per month.

Airport Club Equipped With Kelvinator

The Shy Harbor Airport at Glencoe, Ill., a flying club, has installed Kelvinator refrigeration equipment in its club house.

Rubber Mounted for Quietness

Noiseless starting and stopping, as well as running, were again improved when rubber mounting was provided for Wagner refrigerator motors. Heavy rubber bushings prevent metal to metal contact between the motor and its support ... just a detail in the making of Wagner motors to fit the job.



Wagner manufactures every commercial type of AC Motor and can recommend without prejudice.

Literature on request

WAGNER ELECTRIC CORPORATION

6400 Plymouth Avenue, St. Louis, U. S. A.

Wagner Sales Offices and Service Stations in 25 Principal Cities

Products: FANS... Desk... Wall... Ceiling TRANSFORMERS...Power...Distribution...Instrument MOTORS...Single-phase...Polyphase...Direct Current

Wagner
...quality

61-6331-9

WHY GAMBLE WITH MULTIPLE INSTALLATIONS

USE

Clifford Packless Valves AND BE SAFE

Particularly Designed For Multiple Refrigeration Installations. Listed as Standard by the Underwriters Laboratories. Permanently Leak-Proof

Clifford Packless Valves cannot be injured either by opening or closing. In a wide open position the valve stem is back-seating, which doubly insures against disastrous leaks. Easily attached to mounting board or wall box. Overall length 5", overall width 2". Ample clearance. No wrenches needed.

A Perfect Defrosting Valve

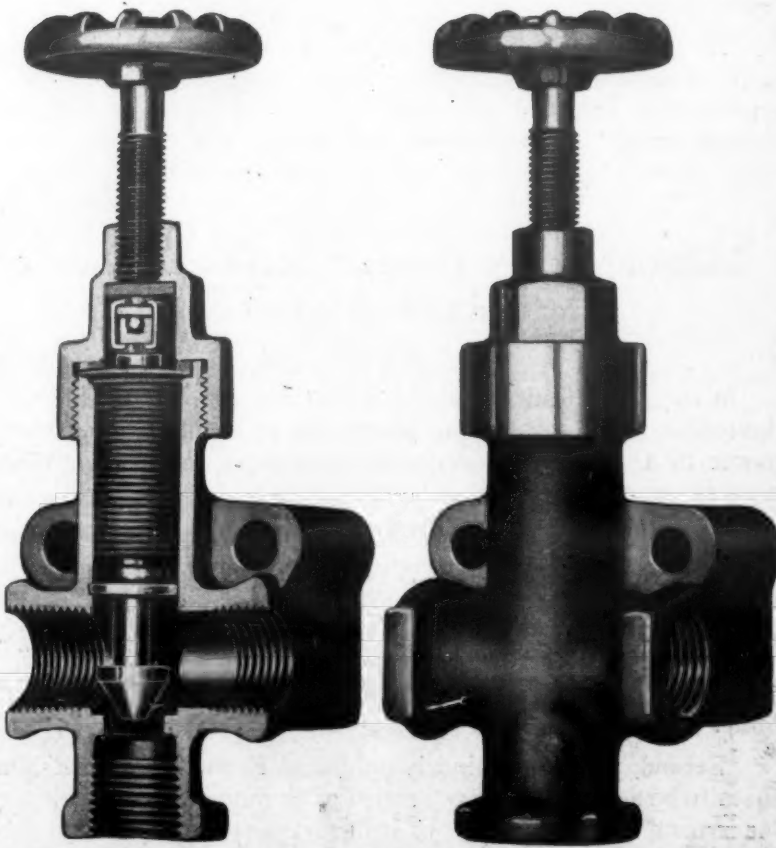
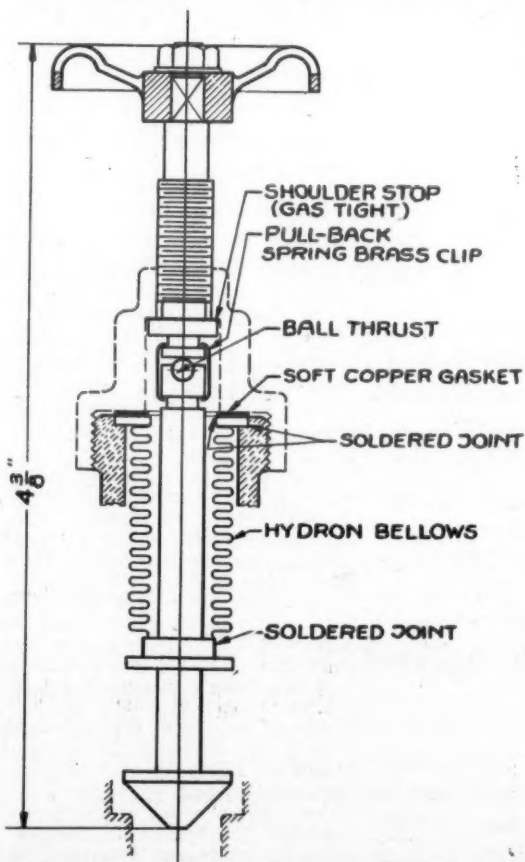
The following is summarized from the Underwriters' Laboratories Report of January 23, 1929: "The manufacturer is an established concern whose standing needs no comment. The results of the Strength Test indicate that the valve is of such construction as to withstand at least 3500 lb. per sq. in. This indicates suitability for working pressures up to 700 lb. per sq. in. with a factor of safety of 5. The device is practicable, reliable, strong, and can be manufactured with the requisite degree of uniformity. THIS VALVE COMPLIES WITH ALL REQUIREMENTS SPECIFIED IN THE NATIONAL BOARD OF FIRE UNDERWRITERS INSTALLATION CODE FOR MULTIPLE REFRIGERATING SYSTEMS."

Write or wire for samples and prices

CLIFFORD MFG. CO.

564 EAST FIRST ST., BOSTON, MASS.

Makers of Hydrons—the Hydraulically Formed Metallic Bellows



THE PENALTY OF AN INFERIOR PRODUCT EXPRESSES ITSELF IN COSTLY DISAPPOINTMENT

ELECTRIC REFRIGERATION NEWS

The Business Newspaper of the Refrigeration Industry

PUBLISHED EVERY TWO WEEKS BY

BUSINESS NEWS PUBLISHING CO.

550 Maccabees Building, Woodward Avenue and Putnam Street
Detroit, Michigan. Telephones: Columbia 4243-4244

Subscription Rates:

United States and Possessions: \$2.00 per year; three years for \$5.00
All Other Countries: \$2.25 per year; two years for \$4.00

Advertising Rates on Request

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JULY 17, 1929

The History of a Policy

Electric Refrigeration News early sounded a warning against the unwise practice of using the refrigerant as a selling point. In the fifth issue (December 8, 1926) this subject was discussed in an editorial as follows:

"That the same electricity which makes the iron hot can also make the refrigerator cold, is a puzzle to the public. What goes on inside the device is highly mysterious. We have known how to make heat for ages, but making cold could only be done to a slight degree by the layman. It is natural that this new application of electricity should excite the imagination of the public."

"That gas of some kind is used in the process only adds to the mystery. Gas connotes an element of danger. Every year hundreds fail to heed the admonition, 'Don't blow out the gas'—with disastrous results. The war impressed the public with a new fear of gas."

"It would seem that any salesman would know better than to attempt to sell an electric refrigerator to a woman by talking about the GAS it uses. It is bad enough to talk about an odorless, non-poisonous, non-explosive REFRIGERANT."

"But the height of folly is certainly reached by talking about the 'dangerous' gas used in some other make of refrigerator. If such is true it may call for proper action of health authorities or the numerous regulatory bodies which inspect everything electrical. But when a salesman undertakes to create confidence in his product by instilling fear of another (which looks just like it) his process of reasoning is beyond comprehension."

"So far only a few accidents have occurred. Reports from these very infrequent cases have probably been exaggerated. It is inevitable that headline writers should seize upon any new and unusual feature. It is greatly to be regretted, however, if any conscious effort should be made to cause needless alarm on the part of the public."

"Contaminated food shortens the lives of thousands of people annually. Except in cases where a group of people are stricken at one time, or when death results almost immediately, intestinal afflictions resulting from poor food have little news value. They are too common to be NEWS."

"Electric refrigeration represents the greatest advance in the art of food protection in the home that has occurred in modern times. Its importance in promoting health, especially of children, cannot be overestimated."

"In general, electrical methods are far safer than any other means of accomplishing the same tasks in the home. The electrical industry has accepted the responsibility of guarding against the slightest danger to employees and users. The confidence of the public in electrical service is justified and must be maintained."

Editorial Policy Toward Accidents—Industry Entitled to Full Information

In the sixth issue (Dec. 22, 1926) the attitude of Electric Refrigeration News toward the discussion of accidents was stated in answer to a subscriber's criticism of a news report regarding the Danbury case. The answer, in part, was as follows:

"First, Electric Refrigeration News has been established as 'the business newspaper of the electric refrigeration industry.' It is edited primarily for the benefit of manufacturers, distributors, dealers and public utility companies. The material is selected with those problems in mind which concern these groups in the production, merchandising, installation and servicing of electric refrigeration to the public."

"Second, when anything is published in the New York Times it ceases to be a secret. A large section of the public has been informed. Under such circumstances, we believe the trade is entitled to have the same information."

Third, in the official report of the accident referred to it is pointed out that while the installation was made by a 'competent

plumber,' he had no prior experience in the installation and testing of electric refrigerators. We believe, therefore, that if there is a possibility of accident in any step of the installation or testing of equipment of any make, the industry is entitled to full information in order that proper instructions may be given to employees and all necessary precautions taken.

"The electric refrigeration industry is confronted with many problems. . . . We cannot ignore this situation just because it is difficult, and have no intention of doing so. . . . accidents represent a problem to the paper, as well as to the industry. Our natural preference is for the good news. But this is a service paper. It is not a propaganda sheet. The problems of the industry are our problems. . . . It was reprinted in Electric Refrigeration News with the hope that it might help the industry in guarding against another accident and more 'undesirable publicity' in the newspapers."

The News Advises Against Stirring Up Enmity of the Ice Industry

It is easy to criticize the ice industry for taking advantage of an unfortunate situation by using paid advertising space to alarm the public, but we must remember that the ice men have been greatly irritated in past years by electric refrigerator advertising. Electric Refrigeration News has repeatedly advised against the use of advertising which stirs up the enmity of the ice industry. In the seventh issue (January 5, 1927) the following appeared in an editorial:

"During 1926 many a wordy battle has been fought over the iceman and much printers' ink has been spilled in the consideration of the woes which electric refrigeration has brought upon him. It was in January, at a meeting of electric refrigeration manufacturers, that sales and advertising managers seriously and eloquently debated the question: 'Shall we knock the iceman?'"

"It was in the spring that a meeting was called in Chicago wherein representatives of both ice and electric refrigeration interests got together and mutually agreed that they had a common problem of educating the public to a better appreciation of the advantages of refrigeration and that no good would come from negative advertising by either branch of the industry."

"Throughout the year, as new companies entered the electric refrigeration business, and as advertising men started their campaigns, it was a standardized procedure to open up by taking a few 'cracks' at the iceman on general principles before getting down to the business of selling electric refrigeration."

The News Points to Another Reason for Avoiding Discussion of Gas

The News has also taken occasion to point out the desirability of friendly relations between those interested in electric and gas refrigeration. Commenting upon this new competition for electric refrigeration in the same editorial mentioned above (January 5, 1927) the following reference was made to the habit of using refrigerant gas as a selling point:

"If the gas machine should prove to be a formidable competitor of the electric, the situation will not be without its compensations. The electric refrigerator dealer will probably quit talking about the gas used in their own and other makes of electric machines, since such talk will merely accentuate the association of refrigeration with gas in the public mind."

"It is possible, also, that the appearance of a new and outside 'enemy' will distract the electric refrigeration interests from fighting each other. The idea of co-operation may take on a new significance. It is even possible that we will forget to 'razz' the ice man."

Executives are Urged to Work Out A Constructive Program

In an editorial December 7, 1927, the News again called attention to the inevitable result of advertising copy and sales arguments designed to destroy confidence in competitive products. Manufacturing executives were urged to meet and thrash out their differences.

"Later in the same year the storm centered around the subject of refrigerants. The exponents of certain chemicals endeavored to promote their own machines by emphasizing the undesirable characteristics of materials used in competitive machines. Again the result was that those whose products were disparaged were not slow to retaliate in kind. The net result was a general mud-slinging contest, at which the ice man was a gleeful spectator."

"The executives who are responsible for the advertising policy of the different companies are certainly big enough to settle such questions in a manner which will be to their own best interests as well as to the best interests of the industry as a whole. A way should be found which will enable these executives to meet each other around a table where they may thrash out their differences and arrive at a reasonable constructive program. Electric Refrigeration News strongly urges that steps be taken, such as have been

(Concluded on Page 13)

SERVEL DEDICATES SAFETY PATENT TO ENTIRE INDUSTRY

Offers to License Any Company for Nominal Fee of \$1.00

SERVEL, INC.,
51 East 52nd Street
New York, New York

July 9, 1929.

Electric Refrigeration News,
Detroit, Michigan.

Re: Multiple Installations

In its many years of activity in refrigeration, Servel has always taken the unqualified position that no effort should be spared in providing safe equipment and in safeguarding to the utmost, the health and lives of users of automatic refrigeration.

After an extended period of research, Servel has developed a system of piping and connections for multiple installations which I believe to be a vast improvement in this field and which includes features of safety securing the greatest protection to the public. This system is described in a separate communication which I believe will be published in this month's issue of ELECTRIC REFRIGERATION NEWS. The outstanding features of the system are the inclusion of the liquid refrigerant tubing within heavy suction pipe and the provision of junction boxes at different levels, all made and connected so that if there is a leak in the liquid line the refrigerant will be trapped and retained in the suction line.

This system has been made the subject matter of a patent application, filed in the United States Patent Office, May 23, 1928, Serial No. 279,946, entitled, "Multiple Installation Refrigeration Systems," which application has been assigned to Servel, Inc. The Patent Office has found that the subject matter of this system is broadly patentable.

Following its policy as above stated, Servel is desirous that the best equipment from a safety point of view be used in the refrigeration industry. I therefore request you to state to the refrigeration industry through the medium of ELECTRIC REFRIGERATION NEWS that Servel invites the electric refrigeration industry and the public to use piping systems for multiple installations as described and claimed in patent application Serial No. 279,946, and to that end stands ready to grant to any manufacturer of, or concern installing, multiple installations who sends a written request therefor accompanied by a check for \$1.00, a license under the patent to issue on the above application Serial No. 279,946 for the life of the patent without further consideration. In making this offer, it will be understood, however, as a condition thereto, that such licenses shall relate only to piping systems described and claimed in the above patent application Serial No. 279,946; and the patent to issue thereon and such license will not grant, or be construed to grant, the right to use any other invention or inventions covered by patents or applications owned or controlled by Servel, Inc.

Very truly yours,
FRANK E. SMITH,
President.

GENERAL ELECTRIC STATES POLICY ON MULTIPLE SYSTEMS

Issues Statement to Guide Distributing Organization

GENERAL ELECTRIC COMPANY
Electric Refrigeration Department
Cleveland, Ohio

General Letter No. S-37

July 6, 1929.

Chicago Refrigerator Accident

The publicity which has been given to the recent death in Chicago, which is alleged to have resulted from the "accidental inhalation of methyl chloride," may be partially explained by the fact that it is a most unusual occurrence and, therefore, has news value. Since the coroners' jury verdict, there is a tendency to charge other recent deaths to the same cause.

Any discussion of the subject is more likely to be harmful than otherwise because it will raise more doubts and questions than it can possibly answer. We, therefore, have discouraged publicity and are particularly anxious that no petty advantage be taken of our competitor's misfortune. However, in self-protection it appears advisable to make this additional statement.

The Chicago cases are alleged to have developed in apartment houses where methyl chloride has been pumped to the various apartments from a central compressor located in the basement. This is the so-called multiple system of refrigeration which the General Electric Company has always disapproved partly for

(Concluded on page 13, column 3)

The History of a Policy

(Concluded from page 12)

recently proposed by various leaders, to bring about a situation which will prevent, or at least minimize destructive dissension in the ranks of the industry."

The Public Should be Warned Regarding Any Element of Danger from Leakage

The importance of informing customers regarding any element of danger involved in the event of leakage was emphasized in an editorial June 20, 1928. If the industry fails to protect the public, control will be established by outside agencies and such regulations may become oppressive and restrict the development of the art.

"Industry, in general, is devoting increased attention to safety measures for the protection of employees and the public. Any concern which fails to take reasonable precautions against accidents is deemed grossly negligent and the courts are inclined to inflict severe penalties upon those who so disregard the rights of others.

"Electric refrigeration equipment, combining as it does, a now familiar application of electricity with a less well-known application of chemistry, has not made its progress without an occasional accident. . . . If repeated a sufficient number of times, the negligence or errors in judgment responsible for such accidents will invoke the penalty of loss of confidence in the industry.

"Electric Refrigeration News takes the position that any serious accident due to failure of equipment on the premises of a customer is a matter of consequence to the entire industry. Every employee having to do with the installation or servicing of equipment is certainly entitled to full information regarding any risk which may be incurred in the handling of chemicals or other necessary parts of the apparatus. The public should be given warning regarding any element of danger involved in the event of leakage. Any effort to avoid these responsibilities will only result in the establishment of control by outside agencies. Whenever such steps become necessary, the action is almost invariably of an unduly drastic nature. In protecting the public, the industry will protect itself against oppressive regulation."

Best Interests of the Industry Will be Served by Free and Open Discussion

Discussing the difficulties of arriving at a satisfactory safety code in an editorial January 16, 1929, the News expressed the firm belief that fair and safe regulations could be evolved providing all interests were fully informed regarding the situation. Free and open discussion was urged to supplant secret diplomacy.

"The efforts of various organizations to develop rules governing the installation of refrigeration equipment have stirred up many controversies with the result that a satisfactory solution has been postponed for months and years. . . . The News has not felt called upon to judge the merits of the various arguments, but has held firmly to the belief that regulations fair to the industry, and offering reasonable protection to the public, will be evolved if all interests are properly informed and given due consideration. . . . We take the position, however, that the best interests of the industry will be served by free and open discussion, and that no permanent good will come from a code which must be put through by secret diplomacy."

Competitive Influences Should Not be Allowed to Hamper Safety Work

That code development is a job for engineers and that safety to the public, rather than commercial advantage, must be the dominant consideration, was asserted in an editorial June 19, 1929.

"It is our belief that the engineers would have found no great difficulty in reaching an agreement as to what constitutes a full measure of protection to the public if they had been unhampered by commercial considerations in their study of this problem. The insistence of executives that safety regulations be so drawn as to protect the investment in existing designs and the efforts to use the code as a means of embarrassing new competition, have been allowed to confuse the issue.

"It is up to the engineers, we believe, to take a stand that will justify their professional position, and put through a code which will serve the only purpose required of it—that of protecting the public against undue hazards to safety. The code is an engineering job, and refrigerating engineers will lose an opportunity to advance themselves and their profession if they fail to measure up to this situation."

Electric Refrigeration News Believes:

(1) That national, state and local codes should be uniform in their requirements and designed to serve but one purpose, i. e., to protect the public against hazards to safety.

(2) That satisfactory regulation can only be secured by the free interchange of knowledge obtained from scientific research and practical experience.

(3) That the industry must be fully informed regarding any and all hazards, however remote, in order to insure the installation of equipment by intelligent and competent men; also that the public must be told the truth and that any evasion of facts will only prove a boomerang to the industry.

GENERAL ELECTRIC ISSUES STATEMENT

(Concluded from page 12, column 5)

the reason that being subject to the faults of unskilled workmen on the ground, leaks of large quantities of refrigerant may result. We regard this type of installation less satisfactory for other reasons and believe that more experience will further substantiate our position. We have manufactured only hermetically sealed, individual units using small quantities of a non-poisonous, non-inflammable, and non-explosive refrigerant (sulphur dioxide) which, unlike methyl chloride, has the added advantage of a pungent odor easily detected in the air.

There must be nearly two million household and commercial type refrigerators in this country using the same refrigerant we use. So far as we know, there is not a single reported case of injury or death chargeable to it. These facts are presented for your own information and should not be used nor should the subject ever be discussed except to satisfy our own people or customers, who may be disturbed over the current reports.

P. B. ZIMMERMAN.

LASSEN

TEMPERATURE—PRESSURE

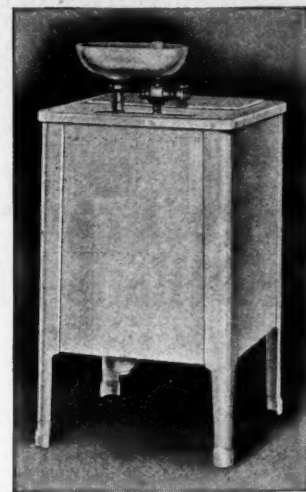
CONTROLS

Positive Range and Differential Adjustment

Non-Deteriorating Mercury Tube Switch—Meets all Requirements

GOODNOW & BLAKE
MFG. CO.

3840 BEAVER STREET,
DETROIT, MICH.



Capacity 6 to 10
Gal. water per hr.
Cooled from 80° to
50° F.

Porcelain
Enameled
Cabinet.

The "EBCO" COOLER FOUNTAIN

with automatic stream control

The automatic pressure valve regulates the drinking stream to a steady convenient height regardless of any variation in line pressure—no water waste or annoying squirting.

The interior of the cabinet is of sheet copper. Water and cooling coils are separated to prevent contamination. The Cooler may be installed with 1-3 or 1-4 H. P. Compressor—contained within the cabinet or away from it. The cooler is furnished complete except refrigerating equipment.

Write for Full Details

THE D. A. EBINGER SANITARY MFG. CO.

401-11 W. Town St.

Columbus, Ohio

Manufacturers also of Ventilated Closets, Urinals, Wash
Fountains and Steel Partitions for Toilet Rooms



RIGHT NOW....

as plans for the future are being made in the Refrigerator Industry—the improvement in performance of the refrigerator cabinet stands out as the most important development of the year.

The growing demand for Dry-Zero insulated cabinets is evidence of one of the inevitable changes that was bound to take place. Our next announcement in this publication will tell you WHY.

dry-zero corporation

130 n. wells street
chicago, illinois

A Norge Franchise Means Definite Profits

Profits accrue in electric refrigeration distribution when sales, installation and service costs are kept at the lowest possible level.

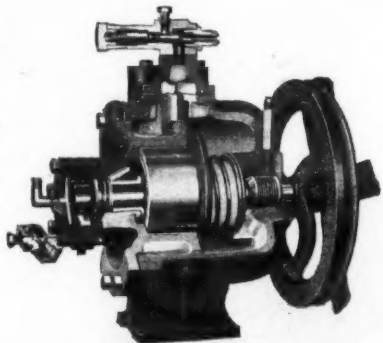
IN nearly every section of the country you find some progressive, wide-awake firm, perhaps a hardware, radio, automotive equipment or electrical supplies concern, turning their successful merchandising experience to the distribution of NORGE electric refrigeration. They find in the NORGE franchise and product the things which their experience tells them are the basis for establishing a profitable business.

Their JUDGMENT says that the selling cost of NORGE equipment will be reasonable because the NORGE unit is soundly engineered and carefully manufactured. NORGE workmen have been doing precision work for nearly twenty years.

REASON says that installation costs will be low because consideration has been given to work in the field and home and because of the extreme simplicity of the NORGE unit. It has fewer moving parts, no complicated valves and no delicate mechanism. Every step in the manufacturing process is subjected to severe testing and rigid inspection.

INVESTIGATION reveals that service costs can not eat up profits because, when NORGE is properly installed, expensive servicing is rarely encountered. Every moving part in a NORGE unit is submerged in oil. Long uninterrupted service and consequent customer satisfaction are natural attributes of a NORGE unit. It is a home-tested mechanical device for preserving food.

Business concerns that let sound judgment, clear reason and the results of careful investigation sway their decisions, are invited to investigate NORGE. Franchises covering a few remaining desirable territories are still available. Write today for descriptive literature.



NORGE

Norge Corporation
Detroit Michigan

E. T. L. Service

for Domestic and Commercial
Electric Refrigeration

Testing and experimental laboratory service for Manufacturer, Distributor, Central Station—Test data exclusive property of client

ELECTRICAL TESTING LABORATORIES

80th Street and East End Avenue, NEW YORK CITY, N. Y.

THERMOMETERS

TEST—ADVERTISING—RECORDING

SPECIAL INQUIRIES REQUESTED

ICELESS REFRIGERATION ACCESSORIES

2401-15 Chestnut St.

Philadelphia, Pa.

precision built MOTOR, TRANSMISSION,
ECCENTRIC and CRANK
SHAFTS

MADE TO YOUR SPECIFICATIONS. SEND US YOUR
BLUE PRINT—WE WILL SEND YOU OUR PRICES.

MODERN MACHINE WORKS, INC.

192-198 MILWAUKEE STREET, MILWAUKEE, WISCONSIN

Key Men in Philadelphia Electric Co. Half Million Campaign



Left to right: J. E. Brown, lieutenant of the campaign; H. H. Berry, commercial agent at Ardmore and winner of the President's prize; W. J. Geiger, lieutenant, and M. C. Huse, who acted as captain in the drive.

THE most ambitious refrigerator sales campaign ever attempted by The Philadelphia Electric Co., was put over with flying colors during the months of April and May, in the Philadelphia territory. Not only did the electric company set a new mark but its pace inspired the local refrigerator distributors and dealers to set a record of 9000 sales.

The quota of the eight Philadelphia Electric Co. districts was exceeded by an average of 116% while the Philadelphia Suburban-Counties Gas and Electric Co., operated by The Philadelphia Electric Co., exceeded its quota by 221%. In all, 2079 refrigerators were sold by the utilities, representing a value of \$578,000.

The campaign was preceded by a dinner for the entire sales personnel, where individual and district prizes were offered to the best producers. William H. Taylor, the president, offered a prize to the district manager whose district had the largest percentage quota in the campaign. The prize, a beautiful marble desk set, was won by Homer H. Berry, commercial agent, main line division of the Philadelphia Suburban-Counties Gas and Electric Co., in which division 269% of the established quota was reached.

Every employee of the 9000 employed by the two combined electric companies was requested to take a part in the campaign, principally through suggesting live leads to the commercial salesmen. In spite of the termination of the campaign being reached in May the sale of refrigerators in the Philadelphia area is continuing at the same rapid pace during the month of June.

TIME-O-STAT CONTROLS OPENS NEW YORK OFFICE

The Time-O-Stat Controls Co., manufacturers of automatic controls, with general offices and factory at Elkhart, Ind., has recently opened New York sales offices at 11 West Forty-second Street, in the Salmon Tower Bldg. This office



Carl W. Scholle

will be the headquarters for all Eastern salesmen contacting Eastern and Atlantic Coast states manufacturers. A large organization of sales engineers and service men will operate from the New York office as well as from the Chicago sales office.

Carl W. Scholle will be in charge of these offices and will act as contact man throughout the Eastern part of the country.

New Concern Handling Copeland Machines in Australia

A new corporation, the Cooling Systems, Ltd., of Sidney, Australia, now represents Copeland Products, Inc., in the Antipodes. The new company is capitalized at \$500,000 and is built around and succeeds J. K. Johnson, Ltd., of Sidney, the business and good will of which it purchased for \$100,000.

O. P. Sellers, who directed J. K. Johnson, Ltd., and who is well known in refrigeration circles in the United States, is managing director of the new company.

E. S. Steiner, Vice President of Indian Motorcycle Co., Dies

E. S. Steiner, vice president of the Indian Motorcycle Co., Springfield, Mass., died recently as the result of an operation. He was elected vice president of the company a short time ago.

WITH KELVINATOR IN PHILADELPHIA AREA



J. C. Burton

Who succeeds Campbell Wood, now Kelvinator utilities manager, as district manager for the Philadelphia territory. He was for 16 years with Detroit Edison as district and merchandise manager.

Hoover Appoints Norge Head As Chairman of Highway Engineering Group

President Hoover has recently appointed J. Walter Drake, vice-president of the Norge Corp., chairman of the group of American highway engineers of the United States Highway Congress who will attend the Second Pan-American Congress of Highways. This Congress will be held at Rio de Janeiro, August 16 to 31.

General Electric Orders For Second Quarter Increase 32%

Orders received by the General Electric Company for the three months ended June 30 amounted to \$119,351,248, compared with \$90,431,957 for the corresponding quarter of 1928, an increase of 32 per cent. Gerald Swope, president, has announced.

For the six months ended June 30, orders received amounted to \$220,716,456, compared with \$170,357,797 for the first six months of last year, an increase of 30 per cent.

JUDSON C. BURNS CO. SOLD 3,400 G. E. UNITS IN APRIL-MAY DRIVE

JUDSON C. BURNS CO., Philadelphia distributors of the General Electric refrigerator, recently completed the best two months of their existence. From April 1st to June 1st, \$1,000,000.00 worth of refrigerators were sold at retail.

Four hundred and ten dollars in extra prizes was distributed among the 25 leading salesmen of this campaign. These 25 salesmen alone sold 1,000 of the 3,400 refrigerators retailed during these two months.

The leader of the campaign was H. R. Steele of Collingdale, Pa., who sold 65 G. E.'s in 54 working days. He received a prize of \$100. The runner up was D. Echil of the Judson C. Burns central store who sold 60 units during the same time for which he was awarded a prize of \$75.

FRIGIDAIRE COMMERCIAL SALES MANAGERS HOLD CONFERENCE AT DAYTON

About seventy Frigidaire commercial sales managers representing every section of the United States attended a two-day conference which was held at the Engineers Club in Dayton, Ohio, on July 8-9.

Sales and engineering problems of commercial refrigeration were discussed by factory officials at the meetings. On Monday evening, June 8, the visiting managers were given a banquet at the Van Cleve Hotel by the Frigidaire Corp.

PRINCE & WHITELY APPOINT C. K. WOODBRIDGE AS HEAD OF NEW INDUSTRIAL DIVISION

Prince & Whitely, New York, N. Y., announce the establishment of an industrial division with C. King Woodbridge, former president and general manager of Kelvinator Corp., Detroit, as director. Harry Soper and C. M. Finney have been named as assistant directors.

The service rendered by the industrial division includes business investigation, planning, operating and development of sales, finance and production for manufacturing, wholesale, retail and service enterprises.

Electro-Kold to Have Permanent Exhibit in Honolulu

The Electro-Kold Corporation of Spokane, Washington, will participate in the formation of a permanent exhibition in Honolulu, Hawaii, of Washington made goods. Albert Rebel has been selected as special trade commissioner and will undertake the exhibit project August 1, 1929.

"This Cabinet Has Cork Insulation"

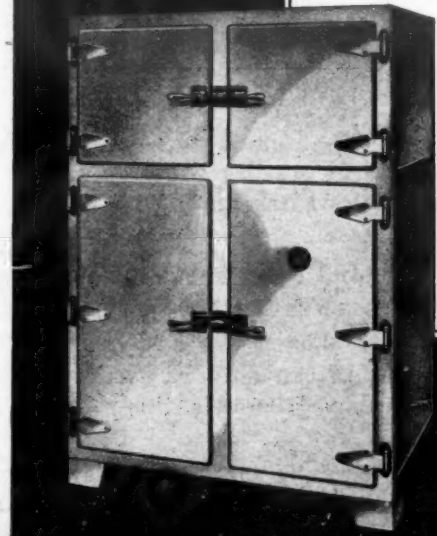
To clinch the sale of a cabinet tell your customer, "This cabinet has cork insulation." A buying public which does not know the difference between a B. t. u. and a Fahrenheit degree knows that corkboard is the finest insulation obtainable. Of course there are differences between corkboard insulations just as there are differences between cabinets. One thing you can be sure of is that NOVOID Corkboard Insulation is as good as we can make it. Send for a sample and descriptive bulletin.

CORK IMPORT CORPORATION

345-349 West 40th St.
NEW YORK, N. Y.

Branch Offices

Atlanta	Hartford
Boston	Kansas City
Buffalo	Philadelphia
Charlotte	St. Louis
Chicago	Troy

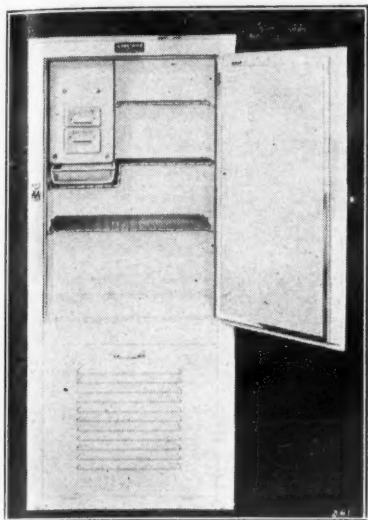


3 NEW LOW PRICED DOMESTIC MODELS IN COPELAND LINE

ADDITION of three new models to the domestic line of electric refrigerators manufactured by the Copeland Products, Inc., has just been announced. The new models are 55½ inches high, 24½ inches wide and have a depth of 22½ inches. They are known as the A-5, the A-5-P Special and the A-5-P and are equipped with a special fin-type tank with porcelain baffles. Approximately five and a quarter cubic feet of space is available for food storage, with a shelf area of nearly nine square feet.

Each model is equipped with a single ice tray of 21 cubes and one double-depth tray containing 42 cubes. The single-depth tray contains a rubber grid permitting easy removal of the ice cubes.

The condensing unit is set upon a newly developed rubber mounting and the machine compartment is insulated with celotex, making for quiet operation.

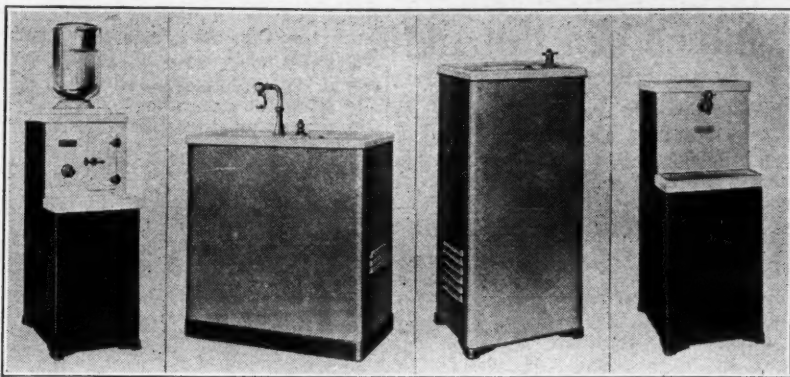


The New Copeland Model A-5

Hardware is of polished nickel and the door is equipped with a compression gasket.

The A-5 is finished in duco throughout. The A-5-P Special has porcelain interior, while the A-5-P has porcelain interior with a front finished in bright metal (Super Ascaloy).

Frigidaire Announces 5 New Series Of Electric Water Coolers



New Frigidaire water coolers, left to right: Seventy series, thirty and forty series, twenty series, and sixty series.

Announcement of five new series of electric water coolers, designed for every purpose from homes to large factories and industrial plants, has been made by Frigidaire Corporation, Dayton, O. All of the coolers contain the pressure storage type of cooling tank. Office coolers can be used either with city or bottled

water. Units may be installed complete, or without compressors for installations. If no cabinet is desired, the cooling tank may be installed in a remote place and made to serve faucets or fountains. Capacities ranging from 2½ to 21 gallons an hour are provided by the various coolers, based on the cooling of water from 80 degrees to 50 degrees.

HAS SPECIAL PUMP FOR REFRIGERATION NEEDS

A compact motor driven centrifugal pump designed primarily for the refrigeration field has been recently introduced by the M. L. Oberdorfer Brass Co., 2309 Thompson Road, Syracuse, N. Y. It is especially adapted for the circulation of liquids and other pumping purposes in industrial, dairy and water cooling refrigerating installations.

The outfit consists of an Oberdorfer all-bronze centrifugal pump direct connected to an electric motor and mounted on a cast iron base. A special non-corrosive bronze is used for the pump to permit handling of either calcium or sodium brine without danger of corrosion.

The makers claim that capacities up to 1800 gallons per hour can be obtained with an Oberdorfer centrifugal pump driven by a 3450 R. P. M. motor. It will pump to a head of 24 feet. The unit is also supplied with 1725 R. P. M. motors for ordinary circulating installations.

Electro-Kold Corp. Reports Number of Installations

Through the Department of the Interior, an order has been received by the Electro-Kold Corp., Spokane, Wash., to install electric refrigeration equipment in the station of the Alaskan Federal Railway at Fairbanks, Alaska. Electro-Kold units are also being installed in the new Spring apartment hotel at Seattle, in the Ontario Apartments at Spokane, and in the clinical laboratory of the New Paulsen Medical and Dental building at Spokane.

Allen-Bradley Appoints Western Michigan Representative

F. L. Reynolds has been appointed district representative for the Allen-Bradley Co., Milwaukee, Wis., manufacturers of electric controlling apparatus. He will look after western Michigan territory and will have his headquarters in Grand Rapids, Mich.

News an Aid in Buying

"Please permit us at this time to express our great satisfaction with the progress made by your paper within the last year. In order to place a proper valuation on its worth one has but to

imagine the great amount of effort necessary to establish satisfactory national buying connections without such medium of exchange of information."—E. F. Belden, American Ice Machine Co., Glendale, California.

We invite you to test the



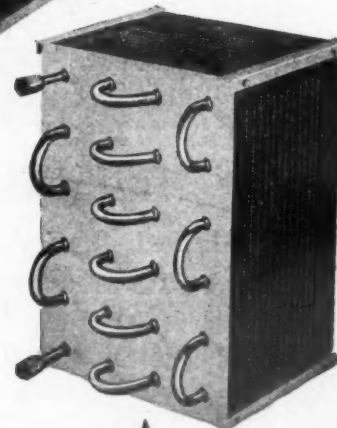
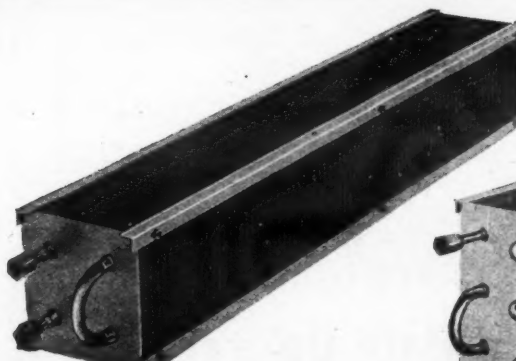
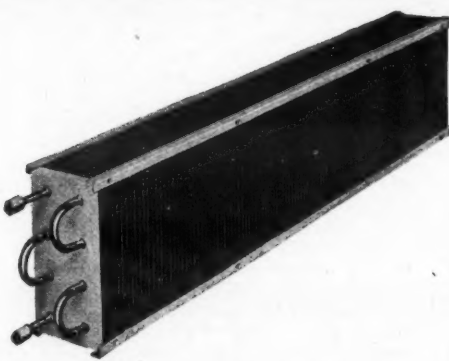
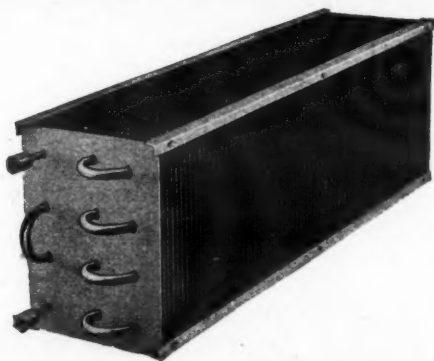
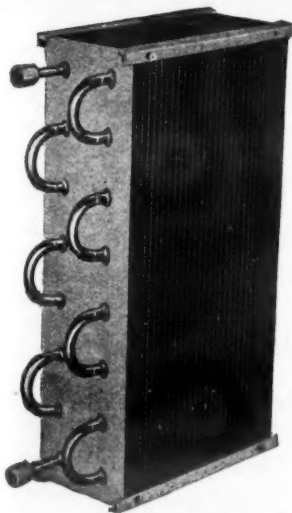
THE moment you test this new Cold Regulator, see how accurately it works, how convenient, and how easy it is to operate, you will want to use it as standard equipment on your ice machine. However, one of the additional features of the Quickfreeze Attachment is the fact that it may be carried as an accessory.



The Quickfreeze attachment can now be supplied on both the well-known refrigerator control switches, Types L and E, used as standard equipment on many of the better ice machines. Manufacturers interested in these controls, and in Quickfreeze, write at once for complete information.

PENN ELECTRIC SWITCH Co.
DES MOINES, I.A.

Manufactured by an organization of proven engineering ability that supplies the largest and best concerns of the country with automatic control switches.



Now Ready the NEW! LARKIN COILS for DRY EXPANSION.

In 9 Types and 56 Sizes

NOW there is a complete line of LARKIN 100% Vertical Surface Aluminum Plate COILS for every type of refrigerant—for every type of commercial refrigeration equipment. We announce to refrigeration manufacturers, distributors and dealers the addition of 9 types in 56 sizes of LARKIN COILS for DRY EXPANSION. This augments our large line of LARKIN Flooded Type COILS. Thus complete service is assured.

LARKIN 100% Vertical Surface COILS have performance features which are of tremendous value to the industry. They positively

eliminate de-hydration and defrosting. They assure lower operating costs. These obstacles to the sale of electric refrigeration equipment for commercial use are definitely and happily solved. The tremendous interest created for our product by manufacturers, distributors and dealers is positive proof of the fact that LARKIN 100% Vertical Surface COILS have filled a definite, long-felt need in the industry.

Full information on our complete line—both Flooded and Dry Types—sent promptly on request. Our plant is in full production and prompt deliveries are assured.

100% Vertical Surface a feature of all LARKIN COILS

The LARKIN Principle of 100% Vertical Coil Surface simply means that by virtue of Larkin Construction the coil surface is the equal of the number of square feet of wall surface of the unit to be refrigerated. This is an important and exclusive Larkin Feature. (Patent applied for.)

Coupon brings facts



PIERSON-LARKIN REFRIGERATING CORPORATION
ATLANTA, GEORGIA

Pierson-Larkin Refrigerating Corp.,
Atlanta, Ga.

Please send me complete information regarding LARKIN 100% Vertical Surface Aluminum Plate COILS on the types checked below. Letterhead attached indicating whether I am a manufacturer, distributor or dealer.

☐ Dry Expansion

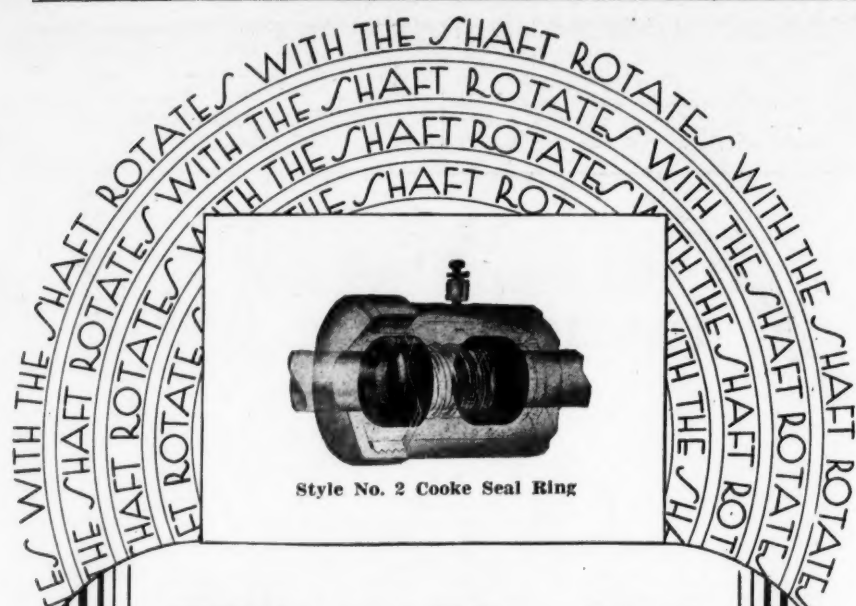
☐ Flooded Type

Name _____ Position _____

Firm _____

Address _____

Address _____



Style No. 2 Cooke Seal Ring

Without This Seal Your Selling Job Is Harder

Electrical refrigerators simply must not leak. To prevent leakage other seals seal *against* the pressure. The Cooke Seal Ring seals *with* the pressure, employs a lighter spring, exerts a minimum pressure against the gland face, causes absolutely no shaft wear, and is really leak proof! Crank shaft need not be hardened, installation is easier, initial cost is little and service costs are eliminated. For these and other sensible reasons Cooke Seal Rings are already standard equipment on the compressors of many leading makes. Write us for details.

COOKE Seal Ring

20 N. Green St., Chicago, Ill. Dept. Q.

COOKE SEAL RING
20 N. Green St., Chicago
Dept. Q.

Please send me your free booklet without obligation.

Name
Address
City State

SAYS REFRIGERATION HELPS TO INCREASE SALES OF POULTRY

Electric Cooling Keeps Poultry In
Perfect Condition

By Helen Lockwood Coffin

THE Harbor Poultry Store, on Newport Boulevard, California, halfway between the city of Costa Mesa and Newport Beach, attracts attention and actually depends for much of its publicity on a big sign near the entrance which announces that this business is "equipped with Frigidaire." Newport Boulevard is a main travelled road, a chief artery from inland to the sea, and thousands of motorists pass this store every day. All of them know fried chicken and most of them know Frigidaire, and the effect of the combination is such that usually they drop in and buy.

Mrs. K. H. Hinkle is the proprietor and manager. She is, so she told me, the only woman in the business so far as she knows, although there are many similar establishments owned and run by men. "You see," she told me, "poultry needs a dry cold. I tried all sorts of icing schemes but none of them suited me. And then this year I put in the Frigidaire. And it work just fine. It is perfectly dry and the poultry is kept in perfect condition. And I can keep the temperature just where it ought to be all the time, which is 32 degrees."

The Frigidaire, a model C, was recently installed in a separate refrigeration house that is eight by eleven feet. There are two compartments in the house, a narrow entrance passage which holds the refrigerator, and the other is the cold storage room. Here the poultry is placed on racks and in times of rush on the floor or "anywhere I can find room." And there they stay until sold. The stock moves so rapidly that she has not had much opportunity to try out the length of time the poultry will "keep" in this new installation but she has experimented and is satisfied that the period would be long enough to cover any of her needs.

"We have tried keeping chickens and rabbits just for our own consumption," she said "and they kept perfectly for five weeks. Just as sweet and fresh as the day they were put in. We ate them and enjoyed them. We would not have known the difference. Sometimes this ability to keep poultry is a God-send. We usually sell off as fast as we can get them ready. But sometimes, at holidays or special days, it is very handy to be able to keep them over."

I asked her how she advertised and she gave a good bit of credit to the Frigidaire sign. Besides the big one in front there are several smaller ones around on the fences which say: "This place is equipped with Frigidaire." Mrs. Hinkle says those signs really give her the advantage of all the national advertising which the Frigidaire Corp. does, because many of the thousands of motorists who pass her door are tourists and come from all over the country. They know the name "Frigidaire" and it seems to them like a bit of home. So they drop in and buy. "That is just about all the advertising I do," Mrs. Hinkle said. "Of course we have a regular clientele and when people buy of us once they come back. Sometimes I run a couple of lines in the local paper among the want ads about holiday time."

U. S. USES KELVINATOR EQUIPMENT IN MAKING QUARTZ CRYSTAL TESTS

Four Kelvinator cooling units have been installed in the Radio building of the U. S. Department of Standards at Washington, D. C. These units are suspended from the ceiling of the basement cooling room, to maintain a temperature of 22 or 23 degrees Centigrade, where tests are made of quartz crystals used in radio transmission sets. These quartz crystals must be maintained at constant frequency and a steady low temperature. The testing cabinet is a standard model and is maintained at a temperature of 37 degrees Centigrade. The constant temperature room has double glass windows for insulation.

J. M. Fernald, manager of commercial sales for Kelvinator Corp., and J. B. Johnson, of the commercial department, both of Detroit, recently inspected the installation. They were accompanied by C. M. Lake and George E. Wagner representatives of Barber & Ross, Inc., Kelvinator dealers in Washington, D. C. This party also inspected a recent Kelvinator installation made at the experimental farm of the U. S. Agricultural Department located at Rosslyn, Va. This installation consisted of cross fin cooling coils, operated by Kelvinator condensing units. The large cabinets are used for laboratory experiments on plants, etc., requiring a constant temperature.

Barber & Ross, Inc., have installed a Kelvinator in the residence of the superintendent of the Soldiers National Cemetery at Arlington, Va.

New York State Suggests Temperatures For Storage of Foods

Interesting in connection with the National Food Preservation Campaign is the schedule of temperatures prescribed for storage of foods by the New York State Department of Agriculture and Markets. Under rules of this department no food may be kept in storage for a longer period than one year, except by special permission of the department. The temperatures suggested, which are not mandatory, are given for the various products in Fahrenheit degrees:

Apple butter.....	42	Fish, salt water (after frozen).....	15	Oils.....	45
Apples.....	30	Fish (to freeze).....	5	Oleomargarine.....	20
Asparagus.....	33	Frogs Legs (after frozen).....	18	Onions.....	32
Bananas.....	58	Fruit Trees.....	30	Oranges (long carry).....	34
Beans (dried).....	45	Fur and fabric room.....	28	Oranges (short carry).....	50
Beer (bottled).....	45	Furs (undressed).....	35	Oxtails.....	30
Berries, fresh.....	40	Game (after frozen).....	10	Oysters, iced (in tubs).....	35
Buckwheat flour.....	42	Game (short carry).....	28	Oysters (in shell).....	45
Bulbs.....	34	Game (to freeze).....	0	Parsnips.....	32
Butter.....	14	Ginger Ale.....	36	Peach Butter.....	42
Butterine.....	20	Grapes.....	36	Peaches (short).....	50
Cabbage.....	31	Ham (not brined).....	20	Pears.....	33
Canned Fruits.....	40	Hogs.....	30	Peas (dried).....	45
Cantaloupe (one to two months).....	33	Hops.....	32	Plums (one to two months).....	32
Cantaloupes (short carry).....	40	Huckleberries (frozen).....	20	Potatoes.....	34
Carrots.....	33	Ice Cream (few days old).....	15	Poultry (after frozen).....	10
Caviar.....	36	Ice storage room (refrigerated).....	28	Poultry, dressed (iced).....	30
Celery.....	32	Japanese Fern Balls.....	31	Poultry (short carry).....	28
Cheese (long carry).....	35	Lard.....	40	Poultry (to freeze).....	28
Chestnuts.....	34	Lemons (long carry).....	38	Raisins.....	55
Chocolate dipping room.....	65	Lemons (short carry).....	50	Ribs (not brined).....	20
Cider.....	32	Lily of the Valley Pips.....	25	Salt Meat Curing Room.....	33
Cigars.....	42	Livers.....	20	Sardines (canned).....	40
Corn (dried).....	45	Maple Sugar.....	45	Sauerkraut.....	38
Cranberries.....	33	Maple Syrup.....	45	Sausage Casings.....	20
Cream (short carry).....	33	Meat, fresh (10 to 30 days).....	35	Scallops (after frozen).....	16
Cucumbers.....	38	Meats, fresh (few days only).....	35	Shoulders (not brined).....	20
Currants (few days old).....	32	Meats, sale (after curing).....	43	Strained Honey.....	45
Cut Roses.....	36	Mild Cured Pickled.....	35	Sugar.....	45
Dates.....	55	Salmon.....	33	Syrup.....	45
Dried Beef.....	40	Milk (short carry).....	35	Tenderloin, etc.....	33
Dried Fish.....	40	Nursery Stock.....	30	Tobacco.....	42
Dried Fruits.....	40	Nuts in shell.....	40	Tomatoes (ripe).....	42
Eggs.....	30	Oatmeal.....	42	Veal.....	30
Ferns.....	28			Watermelons (short carry).....	40
Field grown roses.....	32			Wheat Flour.....	42
Figs.....	55			Wines.....	50
Fish, fresh water (after frozen).....	18				
Fish, not frozen (short carry).....	28				

Many Prospects Uncovered By Keeping Show Rooms Open Evenings

Recognizing the tendency toward group shopping, particularly for household appliances that represent a relatively large investment and are expected to serve for many years, the Consolidated Gas Co., of New York, kept its 57th Street show rooms open evenings during May to feature Electrolux gas refrigerators. It is the first time, except during a special centennial celebration in 1923, that a Consolidated sales department has been open in the evening.

The decision to keep the show rooms open until 10 o'clock each evening came with this year's plan of intensive selling of gas refrigeration. The average retail purchase, company officials realized, was a matter of family discussion and budgeting. For that reason, it was decided to have the display room open at a time when husband as well as wife could inspect and study the gas refrigerator.

A line announcing that the sales room would be open each evening was included in the regular newspaper advertising, appearing in several leading dailies.

Special cards were made and placed in all branch windows and offices. Stickers were attached to gas bills and fifty thousand handsome post cards sent to a selected list of prospects. According to August Rathemacher, manager refrigeration division, the experiment was well worth while. Each evening brought a steady stream of visitors resulting in a substantial number of orders and a large volume of first class leads.

Pharmacy Installs Frigidaire Serum Cooler

D. W. Schermerhorn, proprietor of the Rhinebeck pharmacy, Newburgh, N. Y., has added the third unit of Frigidaire equipment to his establishment, a refrigerator for keeping serums and bottled goods. The other units are an electric soda fountain and ice cream cabinet refrigerated by Frigidaire.

Immediate Delivery

Highest quality seamless copper tubing—perfectly dehydrated and solder-sealed—ready for quick installation. Send your production requirements for quotations—or wire for rush shipment from stock.

WOLVERINE TUBE CO.

SEAMLESS COPPER BRASS & ALUMINUM

1481 Central Ave., Detroit, Michigan

Sales Offices: Cleveland, Chicago, Atlanta, Los Angeles, Denver, Dayton, Ohio, New York City, Dallas, Texas.

Seepage Proof Tube Fittings

A complete line of
brass tube and pipe
fittings especially de-
signed for Commercial
and Domestic
**Automatic
Refrigeration**

"Built Right-to-Stay Tight"

Send for Catalog 36

**Commonwealth Brass
Corporation**

COMMONWEALTH AVE. AND G. T. R. R.

DETROIT, MICHIGAN.

ANALYZES PROPOSED REFRIGERATION CODES ON EXPERIENCE BASIS

E. F. Beldin Defends Central Multiple System

AMERICAN ICE MACHINE CO.
117 N. Maryland Ave., Glendale, Calif.
July 2, 1929.

Electric Refrigeration News,
Detroit, Michigan.

Gentlemen:
In reply to your letter of June 20, we shall be glad to analyze the proposed refrigeration codes as they deal with apartment house refrigeration installations on the basis of field experience with this type of installation.

This experience covers a period of approximately five years, and deals with multiple apartment house installations of from 2 to 130 units per compressor, in which methyl chloride, sulphur dioxide, and "argonium" were used as refrigerant, in quantities varying from five pounds to several hundred pounds, as well as with installations employing ammonia and circulating brine.

We have employed practically every type of pipe, tubing and fittings, and many different arrangements of lines, manifolds and valves.

Before analyzing the various lessons learned, let us ask this question: "What is the outstanding thing that has been demonstrated by this varied field work?"

Perhaps this: that direct multiple refrigeration is in a very early stage of development. The refrigerating plant in the large apartment house of 1935 will differ greatly from the semi-centralized group of small multiple plants—one to

each fifteen or twenty evaporators—with its wasteful paralleling of lines and multiplicity of connections.

The reasons for this conclusion will become apparent from the analysis here presented, and it is mentioned at this point merely in support of the statement frequently made, that multiple refrigeration has not reached the stage at which it can be standardized without definitely retarding progress, and, that, as stated in your editorial comment of June 19, the only purpose required at present of a code is "that of protecting the public against undue hazards to safety."

Now, regarding the lessons learned to date, first let us state the conclusions and then analyze them independently:

1. Centralization of the refrigeration equipment leads to simplification and increased safety.

2. Standard I. P. S. lines and I. P. T. fittings are the most satisfactory from the standpoint of safety. Copper tubing with flared connections should be used as little as practical, and never on lines over 3/4 inch O. D. Tubing of less than I. P. S. should, when concealed, be protected by I. P. S. tubing or conduit.

3. Lines, evaporators and other equipment should be tested to at least three times the highest pressures allowed. This is by all odds the most effective single safety measure for multiple systems.

4. Over 99% of all leaks occur at connections; therefore, all tests of lines and equipment, to be effective should be made after installation.

5. It is best that the refrigerant used should have an unpleasant odor, and be capable of detection by some positive visible test.

6. The limitation of the number of pounds of refrigerant in any one system would be of no practical value as a safety measure.

7. Automatic motor cut-out should be provided, same to be set at one-third the pressure to which equipment has been tested. Safety valve connecting into low-pressure side of equipment should be set at slightly less than test pressures.

8. Both high and low side manifolds and risers should be valved.

9. When properly installed and tested a central multiple refrigeration installation presents practically no safety hazard.

In any case such a system offers less danger than the fuel gas systems installed in practically all buildings, and less hazard than many direct or brine circulating plants in congested markets, restaurants, etc.

Taking these conclusions separately:

1. In a ten-story 100-unit apartment house the five multiple systems originally specified were reduced to a central plant, with single I. P. S. liquid and suction manifolds, extending the full length of the building, replacing the many parallel copper tubes originally called for. Three hundred and twenty feet of tubing and 59 flared joints were eliminated. The number of cylinder gaskets was also reduced, and the duplication of discharge and suction line valves was eliminated. Similarly, a replacing of the condensing equipment and liquid lines so as to eliminate the hydrostatic pressure from the compressor was made possible. One motor, one starting switch, one pressurestat, one condenser, took the place of five of each. In case anything should go wrong, there is no guessing as to which machine to shut off. All these things have undoubtedly decreased the fire and safety hazard.

2. The result here shown is simply the compilation of observations in our own organization. Flared type S. A. E. connections, if properly made by trained workmen, are fairly reliable on 3/4-inch O. D. and 1-inch O. D. lines. Sweated fittings, however, offer the only wholly satisfactory method of joining annealed copper tubing.

The ammonia refrigerating industry, however, supplies the safest technique for all lines which are not called on to withstand over 200 lbs. pressure.

3. Nitro-glycerine could be safely circulated through an apartment building if the lines were built to take care of the maximum internal pressures. We have found that correct pipe and fittings properly installed and tested afford practically 100% insurance against gas leaks.

4. This fact and the accompanying corollary need no further expansion.

5. We have found no refrigerant with which this precautionary measure was not practical, namely that of adding an odor if an odor was not inherent in it.

6. Our men have been present for years where large quantities of each of the common refrigerants were free in the air. Hence the following observations are practical rather than purely theoretical:

(a) Five pounds of refrigerant (approximately the amount which would escape from a household machine) let free in the average apartment would have the same effect as five hundred pounds let into the apartment by the same leak, namely, it would make it highly desirable that those in the apartment open the windows.

(b) No matter what refrigerant is used, if it is provided with a distinct and unpleasant odor, the amount in the entire system is of little importance from the standpoint of safety, as it cannot leak out faster than the size of the pipe or rupture will permit.

7. Observation indicates that high test pressures and low operating pressures are the most feasible protections to the public safety. Experience proves that no multiple system need operate at a head-pressure of over 150 lbs. gauge. If lines are tested to 450 lbs., and operating pressures maintained within the above ratings, maximum safety is obtained.

8. The reasons for this suggestion are evident from the facts analyzed.

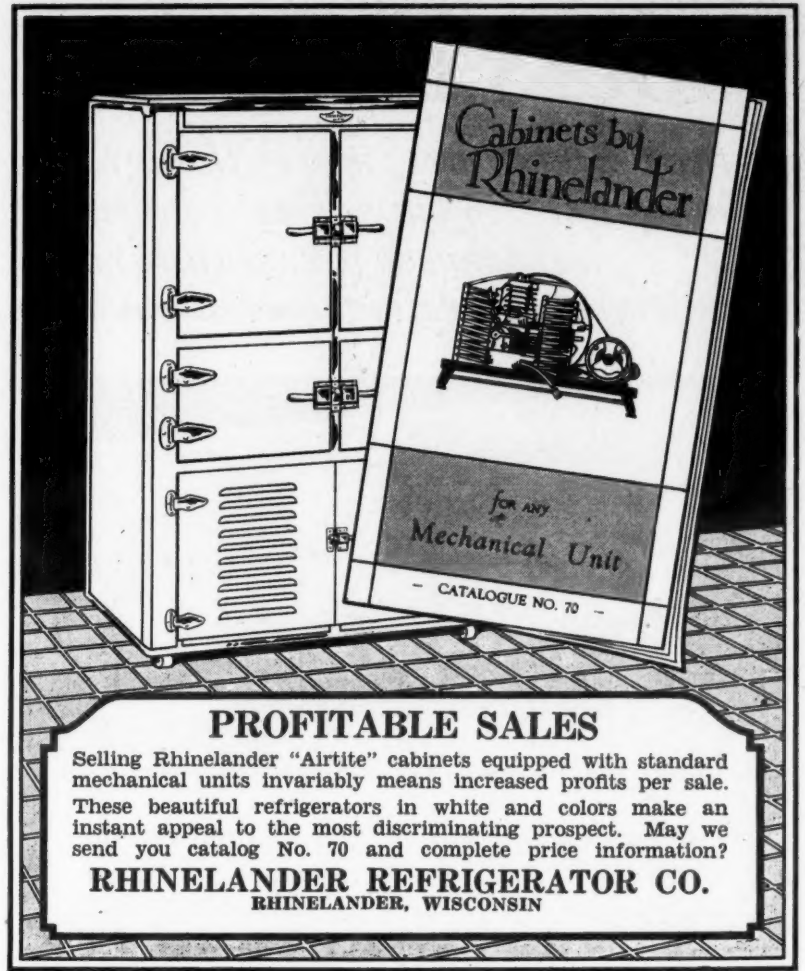
9. No refrigerant in common use appears to present a fire or explosion hazard. Fires, explosions, and "poisonings" from refrigerants have been rumored, but when investigated have proved to be without foundation.

Laws were at one time passed by "feed and fuel" influence prohibiting the piping of fuel gas through the streets and in houses. These laws have since been repealed or forgotten, yet they are much more sensible than attempted limitations to central multiple refrigeration systems, as is shown by the following careful analysis:

- | Fuel Gas | Refrigerant |
|---|---|
| 1. Highly inflammable. | 1. Either non-inflammable or nearly so. |
| 2. Explosive. | 2. No explosions recorded with commonly used refrigerants. |
| 3. Does not warn of leaks. | 3. Easy to detect leaks. |
| 4. Highly toxic, resulting in death without warning. | 4. Slightly toxic. Incapable of causing injury without warning. |
| 5. Pressures very low: lines tested accordingly. | 5. Pressures higher: lines tested accordingly. |
| 6. Source of supply unlimited. | 6. Closed system. Supply limited. |
| 7. Easily discharged into rooms by hand valves. | 7. Not easily discharged by children, etc. |
| 8. Entire system must usually be shut off in order to make repair, making necessary the notification of every tenant against raw gas when gas is again turned on. | 8. Every riser valved, although shut-down would not make notification of tenants necessary. |

It is hoped that these observations may be of some slight assistance in the formulation of a sensible safety code.

E. F. BELDIN,
Assistant Secretary.



PROFITABLE SALES

Selling Rhinelander "Airtite" cabinets equipped with standard mechanical units invariably means increased profits per sale. These beautiful refrigerators in white and colors make an instant appeal to the most discriminating prospect. May we send you catalog No. 70 and complete price information?

RHINELANDER REFRIGERATOR CO.
RHINELANDER, WISCONSIN

To Manufacturers of Electric and Gas Units

Your specifications for CABINETS will be accurately carried out when given to

PUFFER-HUBBARD MFG. CO.
MINNEAPOLIS, MINN.

PATENTS

Searches, reports, opinions by a Specialist in

Refrigeration

H. R. VAN DEVENTER

Solicitor of Patents
Refrigeration Engineer

342 Madison Ave., N. Y.

RUBBER PRODUCTS

Engineering experience, laboratory and production facilities for the development and manufacture of hard and soft rubber products for refrigerator cabinets, equipment accessories and insulation parts.

THE AETNA RUBBER CO.
ASHTABULA, OHIO

MANUFACTURERS OF ICE CREAM CABINETS

We will build Ice Cream Cabinets to your design ready for installation of compressors

REPLACEMENT PARTS FURNISHED

MOTORS METAL MFG. CO.
5936 Milford St. - Detroit, Mich.

KERO TEST

FORGED BRASS VALVES for Mechanical Refrigeration

Quality Shut-off and Cylinder valves in any standard designs or to your specifications.

KERO TEST MANUFACTURING CO.
2525 LIBERTY AVENUE
PITTSBURGH, PENNA.

Insulation is an asset when it's Armstrong's Corkboard

ARMSTRONG'S Corkboard insulation is distinctly an asset to your refrigerator cabinet.

Armstrong's Corkboard insures you a stable, non-deteriorating insulation that will not shrink, swell, disintegrate, or settle; that is nonabsorbent of moisture, odorless, easily installed, and that will retain its original insulating and structural properties as long as the cabinet lasts.

Armstrong's Corkboard so effectively excludes heat that a uniform low temperature is maintained with a minimum of operation, which means customer satisfaction and freedom from complaints and service calls.

Armstrong's Corkboard is so well-known through a quarter of a century of use and widespread advertising for cold storage, house, and roof insulation that the refrigerator buying public accepts it readily as superior insulation. It needs no explanation—raises no question in the prospect's mind. Armstrong's Corkboard is already "sold," and as a sales argument for your cabinet, carries the conviction of quality that makes your selling easier.

Armstrong's Corkboard has no liability of insulation "gone bad," of mounting cost of operation, or of sales resistance with the customer. Everything is on the asset side with Armstrong's Corkboard. Armstrong Cork & Insulation Company, 917 Concord Street, Lancaster, Pa.

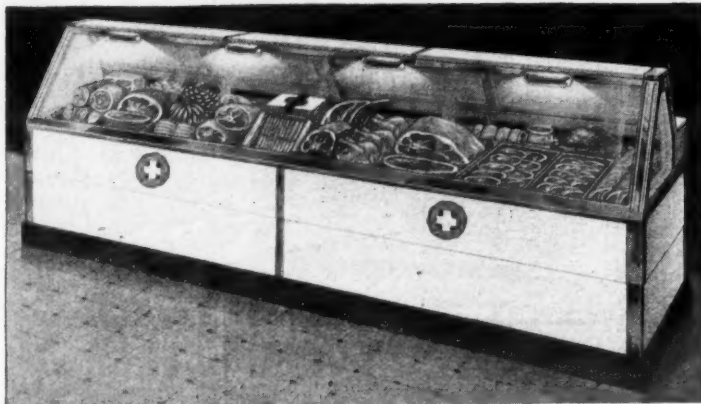


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Armstrong's Corkboard Insulation

Gets Results

that heretofore were thought impossible in this type counter . . . engineered for standard mechanical refrigeration unit.



The best mechanical refrigeration unit in the world can't perform to its best capacity unless the counter in which it is installed is built correctly. The new 5100 Hussmann Quick Service Top Counter not only is built right . . . quality materials and construction through and through . . . but it is especially engineered for a standard mechanical refrigeration unit.

It maintains a lower temperature at the front of the case than where air enters the coil compartment. It provides correct humidity and an ample cold reserve. It controls the temperature and assures positive circulation of air, correct humidity and ample cold.

You can recommend this counter with perfect assurance that it will meet every demand as a food-saver and money-maker. Write now for complete information about our new 5100 line.

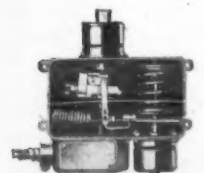


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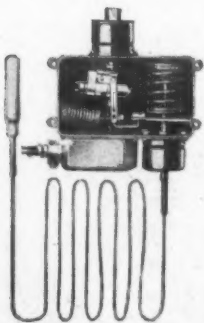
REFRIGERATOR DIVISION OF
HUSMANN-LIG-O-NIER CO.
907-913 North Broadway, Saint Louis

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Saint Louis (2)
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Sales Offices
in all
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Mercoid Dual Control
with low side pressure.
Steel cover removed.



Mercoid Dual Control
with low side temperature
element for remote control.
Flexible tube furnished
regularly in 4' length—on special order
up to 40 feet with or without
threaded union at bulb.

NEW IMPROVED MERCROID DUAL CONTROL FOR TEMPERATURE AND PRESSURE

This control is available in two models, one for temperature and one for pressure. The pressure type furnishes low side pressure control as well as high pressure cut-out. It is really two controls in one instrument. The low side range is from 25" vacuum to 25 lbs. pressure—high side cut-out up to 160 lbs. The operating differential is adjustable as close as 1 lb. or as wide as 17 lbs. A new and very important feature is that in changing the differential only the cutting-in point is affected. This prevents the loss of time in changing adjustment after installation.

The high side of the control operates entirely independent of the low and changes in the low do not affect the high side.

These controls operate with the well-known Mercoid switch—no arc—no corrosion of contacts—and the control carries full line current, either 110 or 220 volts.

The Dual Mercoids are especially well suited for Multiple Hook-ups—Ice Cream Cabinets and general commercial work.

Write today for complete information on these instruments and the Solenoid Valve for water-cooled units.

AMERICAN RADIATOR COMPANY

Accessories Division, Dept. MER-5
40 West 40th St., New York, N.Y.

NEW REGULATIONS DRAFTED BY

REVISION IS MADE IN REFRIGERATION CODE FOR STATE OF OHIO

Covers Installation, Maintenance
and Operation of Mechanical
Refrigerating Systems

A BULLETIN just received from the division of Safety and Hygiene of the Industrial Commission of Ohio contains the tentative specific requirements covering the installation, maintenance and operation of mechanical refrigerating systems. This safety code with revision as of February, 1928, was published the April 25, 1929, issue of the News. Since publication numerous revisions have been made in the code. The code as it now reads is as follows:

General

Sec. 1. The requirements of Part IV shall apply to every refrigeration system. They prescribe for the installation, operation, care, and inspection of refrigerating systems for the purpose of providing reasonable safety for life, health and property.

Sec. 2. It is understood that existing safety regulations as prescribed for welding, building, stairways, exits, belts, moving machinery, steam and electric uses, and anything in such plants not specifically covered by this code, are covered by their respective requirements in refrigerating systems as fully as if specified in this code.

Definitions

Sec. 3. **Adopted Refrigerant Pressure:** That pressure which corresponds to a saturation temperature of the refrigerant 86 degrees Fahr. (30 degrees C.)

Sec. 4. **Container:** A cylinder for the transportation of refrigerants, constructed to conform to the regulations of the Interstate Commerce Commission.

Sec. 5. **Direct Refrigeration:** A system in which the refrigerant is circulated to the material or space refrigerated.

Sec. 6. **Factor of Safety:** The factor of four (4) which multiplied by the test pressure, gives the probable rupture pressure.

Sec. 7. **Flammable Refrigerant:** For the purpose of this Code, is any refrigerant which will burn or explode when mixed with air.

Sec. 8. **Fusible Plug:** A device having a predetermined temperature fusible member for the relief of pressure.

Sec. 9. **Indirect Refrigeration:** A system in which a non-flammable liquid cooled by the refrigerant is circulated to the material or space refrigerated.

Sec. 10. **Liquid Receiver:** A vessel permanently connected to the high pressure side of a system by inlet and outlet pipes for the storage of refrigerant.

Sec. 11. **Noxious Refrigerant:** For the purpose of this Code, is any refrigerant which, when breathed, is harmful.

Sec. 12. **Pressure Imposing Element:** That part of a refrigerating system which draws the refrigerant from the low pressure and discharges it into the high pressure side of the system, such as a compressor or absorber and generator.

Sec. 13. **Pressure Limiting Device:** A pressure or temperature responsive mechanism for automatically stopping the operation of the pressure imposing element.

Sec. 14. **Pressure Relief Device:** A pressure relief valve, a rupture member, a fusible plug or other approved device for relieving the pressure.

Sec. 15. **Pressure Relief Valve:** A valve held shut by a spring or other means, to automatically relieve pressure in excess of its setting.

Sec. 16. **Refrigerant:** The chemical agent used to produce refrigeration.

Sec. 17. **Refrigeration System:** A combination of apparatus in which a refrigerant is circulated for the purpose of extracting heat.

Sec. 18. **Refrigerating Machinery Room:** A room in which is located any pressure imposing element, condenser, receiver or shell type apparatus.

Sec. 19. **Rupture Member:** A device that will automatically rupture at a predetermined pressure.

Sec. 20. **Stop Valve:** A shut-off valve installed in a pipe for controlling the flow of refrigerant.

Sec. 21. **Test Pressure:** The maximum pressure at which safety devices for relief of pressure must function.

Classification

Sec. 22. The class to which an installation belongs shall be determined by the combined weight of refrigerant contained in the condenser, receiver, all evaporators and all other parts of the system connected to a common pressure imposing element.

Class A: A system containing one thousand pounds (1,000 lbs.) or over of refrigerant.

Class B: A system containing one hundred pounds (100 lbs.) or more and less than one thousand (1,000 lbs.) of refrigerant.

Class C: A system containing twenty

pounds (20 lbs.) or more and less than one hundred pounds (100 lbs.) of refrigerant.

Class D: A system containing less than twenty pounds (20 lbs.) of refrigerant.

General Requirements for All Classes

Sec. 23. The Seller shall furnish the Purchaser with a letter stating the name and weight of refrigerant required for operating. This letter to be accessible to inspectors at all times.

Sec. 24. The Seller shall give the Purchaser a certificate of test made showing the pressure to which the high and low sides were subjected and the date test was made. (See Sec. 40.) This certificate to be accessible to inspectors at all times.

Sec. 25. Additions to or changes in a refrigerating system shall be subjected to test in accordance with Secs. 24 and 40.

Sec. 26. Where Purchaser does the work of installing, adding to or changing a refrigerating system, test requirements (See Secs. 24-25-40) must be met; the certificate shall be prepared and signed by the individual in charge of the test.

Sec. 27. Pressure relief valves, pressure limiting devices and rupture members, where required, shall be made of suitable material for the refrigerant employed and shall be constructed and set to prevent the pressure exceeding the test pressure, and shall be legibly marked with the pressure at which they are set.

Sec. 28. The size of relief valves shall be as follows:

Capacity of System	CO ₂ and Ethane Refrigerants		Other Refrigerants	
	No.	Size	No.	Size
up to 1,000 lbs.	1	1/2"	1	1/2"
1,000 to 1,800 lbs.	1	1/2"	1	3/4"
1,800 to 3,000 lbs.	1	1/2"	1	1"
3,000 to 5,250 lbs.	1	1/2"	1	1 1/4"
5,250 to 7,500 lbs.	1	3/4"	1	1 1/2"
7,500 to 13,500 lbs.	1	1"	1	2"
13,500 to 27,000 lbs.			2	2"

Sec. 29. Where rupture members are permitted the equivalent area of the relief valve specified shall be provided.

Sec. 30. Fusible plug, where permitted, shall have a maximum fusing point of 280 degrees Fahr. The free opening shall be one-sixteenth inch in diameter (1/16") for one hundred (100) lbs. or less of refrigerant.

Sec. 31. No stop valve shall be located between a pressure relief device or pressure limiting device and the part of the system protected thereby, except that in the case of a liquid receiver, shell type liquid cooler and shell type condenser, two devices of required size may be used but shall be so arranged that only one can be cut off for repair purposes at any one time.

Sec. 32. Liquid refrigerant level gauge glasses, except those of the bulls-eye type, shall have automatic closing valves and they shall be adequately protected against injury by suitable casings.

Sec. 33. All piping and liquid receivers shall be so installed as to be least liable to damage.

Sec. 34. All piping, fittings and valves shall be suitable for the refrigerant employed.

Sec. 35. Containers shall be disconnected from the refrigerating system when not actually charging or withdrawing.

Sec. 36. A rupture member may be substituted for the relief valve in CO₂ systems and systems operating below atmospheric pressures.

Sec. 37. Every part of the refrigerating system, except control mechanism and gauges, shall be designed for test pressures as follows: For the more common refrigerants in accordance with table, Sec. 41; for any refrigerant not shown in table, Sec. 41, the test pressure for the high side shall be the product of the adopted refrigerant pressure (Sec. 3) multiplied by 1.5 and for the low side shall be the adopted refrigerant pressure.

Sec. 38. The factor of safety in all cases shall be not less than four (4). (See Sec. 6.)

Sec. 39. For refrigerants not shown in the table Sec. 41, the adopted refrigerant pressure (See Sec. 3) as well as the adaptability of the refrigerant shall be passed upon by the Refrigeration Safety Code Committee of the American Standards Association. In the absence of this authority for a refrigerant the use of such refrigerant is prohibited.

Sec. 40. Every part of a refrigerating system, except control mechanism and gauges, shall be tested and proved tight after being assembled, to not less than the test pressures given in the table Sec. 41; for refrigerants not shown in the table this test pressure shall be as provided for in Sec. 37.

Sec. 41. Table of Test Pressures and Noxious and Flammable Refrigerants:

Refrigerant	Test Pressure		Nox.	Flam.
	High	Low		
Carbon Dioxide CO ₂	1,500	750	no	no
Ethane	1,100	550	no	yes
Ammonia	300	150	yes	yes
Propane	250	125	no	yes
Methyl Chloride	150	80	no	yes
Sulphur Dioxide	100	50	yes	yes
Iso-Butane	100	50	no	yes
Butane	75	35	no	yes
Ethyl Chloride	25	25	no	yes
Dichloromethane	15	15	no	no
Dichloroethylene	15	15	no	yes

Class A Requirements—Sections 23 to 41 Inclusive and 42 to 53 Inclusive

Sec. 42. Where noxious refrigerants are used, at least two (2) helmets or masks, tested in accordance with the

requirements of the United States Bureau of Mines for such gas, shall be kept in operative condition and be placed easily accessible from outside the machinery room. Operators of plant shall be trained in their use.

Sec. 43. Every refrigerating system shall have a pressure limiting device (See Sec. 13) to function at not to exceed 90% of the pressure at which the high pressure relief devices are set. (See Secs. 27 and 28.)

Sec. 44. Every refrigerating system shall be provided with one or more pressure relief devices of proper size (See Secs. 27-28) connected between each main discharge stop valve and the pressure imposing element; also on each liquid receiver and shell type apparatus located at the top (See Sec. 31), discharging either to the atmosphere. (See Sec. 46) or into the low pressure side.

Sec. 45. Every refrigerating system shall be provided with a pressure relief device on the low pressure side, discharging to the atmosphere (See Sec. 46) this relief device to be located on the main suction line between evaporators and main suction stop valve at the pressure imposing element.

Sec. 46. Where a noxious and/or flammable refrigerant is used the discharge from the high pressure side relief valves, when not discharging into the low pressure side (See Sec. 44) shall be conducted to the outside atmosphere to not less than 12 feet above grade. The area of the discharge pipe shall be not less than the combined area of the various relief devices connected thereto; the outlet shall be turned downward.

Sec. 47. Every refrigerating system using electrical equipment in the machinery room (See Sec. 18) shall have an emergency switch controlling all of the electrically operated refrigerating machinery, located or controlled outside the machinery room where it can be easily reached in case of emergency.

Sec. 48. Every refrigerating system, where the discharge pressure can exceed (50) fifty pounds, shall have a check valve placed in the discharge line of each pressure imposing element and before the discharging line enters either an oil trap, a main discharge line from other units or the condenser.

Sec. 49. A refrigerating machinery room in which a flammable refrigerant is used, shall have no fire, flame or arc light within said room.

Sec. 50. Every machinery room shall be provided with independent adequate means of ventilation; if a mechanical system of ventilation is used it shall be so arranged that it may be started from outside the machinery room.

Limitations As to Use

Sec. 51. The two following sections, viz., 52 and 53, do not apply to buildings used exclusively for ice making and/or chemical purposes; nor to systems covered by class D.

Sec. 52. All refrigerating apparatus installed in buildings in which persons are employed above the first floor is prohibited, unless all the apparatus containing the refrigerant is placed in a separate machinery room or rooms from which any outside refrigeration shall be supplied by the Indirect Method (See Sec. 9). If a flammable or noxious refrigerant is used the machinery rooms shall have no connection with other parts of the building and shall be entered and ventilated from the outside only.

Sec. 53. Refrigerating systems using a flammable or noxious refrigerant and employing the Direct Method of refrigeration (See Sec. 5) are restricted to the first floor and basement of buildings. Elevator shafts and stair wells extending into that portion of the building used as a refrigerating machinery room, shall be enclosed with tight walls and close-fitting, self-closing doors.

Operating Precautions

Sec. 54. The compressor should be protected against slugs of liquid by proper arrangement of trap or accumulator on suction line with suitable arrangement for the return of the entrapped liquid to the working system.

Sec. 55. Tightening of bolts or flanged joints when under pressure should be avoided.

Sec. 56. In testing with air pressure care should be taken to prevent the temperature at any point rising above one hundred and thirty (130) degrees Fahr.

Sec. 57. The following items should be posted in a conspicuous place; the names and addresses with phone numbers of the engineers or operators and the physician to call in case of emergency; the location of the nearest fire alarm box.

Sec. 58. Containers before charging should be kept in a cool place.

Class B Requirements—Sections 23 to 41 Inclusive and 59 to 68 Inclusive

Sec. 59. Helmets or masks, same as Sec. 42, except only one required.

Sec. 60. Pressure limiting device same as Sec. 43.

Sec. 61. Pressure relief devices same as Secs. 44 and 45.

Sec. 62. Discharge of relief device same as Sec. 47 or see Sec. 68 for modification.

(Concluded on page 19)

STATE AND CITY GOVERNMENTS

(Concluded from page 18)

Sec. 63. Remote control same as Sec. 47.

Sec. 64. Fire and lights same as Sec. 49.

Sec. 65. Ventilation same as Sec. 50.

Sec. 66. Limitations as to use same as Secs. 51 to 53 inclusive.

Sec. 67. Operating precautions same as Secs. 54 to 58 inclusive.

Sec. 68. Where ammonia is the refrigerant, the discharge of relief devices (See Sec. 62) may be into a suitable body of water which shall be used for no other purpose except ammonia absorption. At least one (1) gallon of fresh water shall be provided for every pound of ammonia in the system (See Sec. 23). The water used shall be protected from freezing without the use of salt or chemicals. For other noxious or flammable refrigerants, the discharge may be into a suitable body of non-flammable absorbent, provided that this absorbent and method of use shall have been first passed upon by the committee on Refrigeration Safety Code of the American Standards Association.

Class C Requirements—Sections 23 to 41 Inclusive, and 69 to 74 Inclusive

Sec. 69. Pressure limiting devices same as Sec. 43.

Sec. 70. Pressure relief devices same as Secs. 44 and 45.

Sec. 71. Discharge relief devices same as Secs. 46 or 68.

Sec. 72. Ventilation same as Sec. 50.

Sec. 73. Limitations as to use same as Secs. 51, 52, 53 inclusive.

Sec. 74. Operating precautions same as Secs. 54 to 58 inclusive.

Class D Requirements—Sections 23 to 41 Inclusive, and Sections 75 to 76

Sec. 75. Pressure limiting device same as Secs. 44 and 45, except where air cooled condensers are used, it may be omitted.

Sec. 76. Pressure relief devices same as Sec. 43 or fusible plug (See Sec. 30); unless the equipment is so constructed that when subjected to an abnormal outside temperature, such as that generated in a fire, it will not burst due to the expansion of the refrigerant.

LOS ANGELES PLANS RULES TO GOVERN MULTIPLE SYSTEMS

PROPOSED REVISION IN CODE COVERING "MULTIPLE REFRIGERATING SYSTEMS" FOR THE CITY OF LOS ANGELES

This section of the Ordinance shall apply to all Multiple Refrigerating Systems as herein defined.

1. The term "Multiple Refrigerating Systems" shall mean and include all systems in which the refrigerant from a common source is delivered to two or more separate refrigerator cabinets, each containing one or more evaporators, where such cabinets and evaporators are used for domestic or tenement purposes.

2. A Multiple Refrigerating System shall be construed under this Ordinance as consisting of one compressor and all the refrigerant piping and evaporators attached thereto.

3. Compressors shall preferably not be in a room containing combustible material and shall, in any case, be located at least 10 feet from such combustible material.

Compressors shall be located in an accessible place inside or outside the building.

Where compressors are installed in a room not specifically provided for this purpose and are accessible to the general public, such compressors must be provided with a suitable guard, partially or wholly covering all moving parts.

4. Refrigerant lines must be of the following materials and specifications and installed in the manner hereinafter provided:

(a) Standard iron-pipe-size pipe for refrigerants limited to pressure of 200 pounds or less; and extra heavy pipe for refrigerants not so limited.

(b) Approved annealed seamless copper tubing of not less than .034 inch wall thickness for diameters not exceeding 1/2 inch and of corresponding greater wall thickness for larger diameters, for refrigerants limited to pressures of 200 pounds or less.

Where approved annealed seamless copper tubing is used to carry the refrigerant, such copper tubing shall be protected against mechanical injury by encasement in iron or steel pipe, flexible metal enclosure, metal molding or metal raceways. It shall, however, be permissible to run such approved annealed seamless copper tubing without the protections cited above on lines running between the valves on the compressor and the distributing panel or manifold for a distance not in excess of five feet, and between the distributing panel or manifold and the evaporator for a distance not in excess of five feet.

(c) All refrigerating line encasements shall be rigidly secured to the walls or

other permanent support. Tubing shall be independently supported in a proper manner to prevent excessive vibration or strains at joints or connections.

(d) The main refrigerating line or lines from the compressor shall be carried to a distributing panel or manifold and all risers on one system shall connect with said distributing panel or manifold and each riser be provided with a shut-off valve.

5. (a) Where standard iron pipe is used to carry the refrigerant, such pipe shall be joined by extra heavy fittings having standard pipe threads, or may be welded or brazed, and shall be made up of materials suited to the refrigerant employed; or, if flange fittings are used for pipe connections, they shall be of the recessed gasket type.

(b) All joints in copper tubing shall be of sweated type, except that S. A. E. flared joints may be used for tubing not more than 1/2 inch in diameter.

(c) All joints in tubing shall be accessible.

6. (a) Valves, flare nuts and other fittings shall be of the forged type or semi-steel castings.

(b) Each service connection shall be provided with a shut-off valve on both high and low side, in an accessible place. Such service valves must be enclosed when practicable in a suitable metal box.

(c) All evaporators of the flooded type shall be provided with shut-off valves to all connections.

7. (a) The maximum pressure allowed on any refrigerating machine in use in a multiple system shall be governed by the refrigerant used, and shall in no case exceed that shown in the following table:

Refrigerant Used	Maximum Pressure Lbs. per sq. in.
Carbon dioxide	1,300
Ammonia	200
Methyl chloride	120
Sulphur dioxide	100
Isobutane	85
Butane	65
Ethyl chloride	45
Methylene chloride	25

(b) In case a refrigerant is used composed of two or more of the above refrigerants in quantities of more than 10% by weight, the maximum pressure allowed shall be the average of the allowable maximum pressures of each of the refrigerants, provided, however, that impurities of less than 10% by weight of the total refrigerant in any system shall not alter the maximum pressure allowable within the meaning of this ordinance.

(c) If a refrigerant is used which is not mentioned in the above table, the pressure shall be determined by ruling on the part of the Board of Building and Safety Commissioners upon submission of the following data by the petitioner:

Normal condensing pressure at 80 degrees F.

Inflammability.

Toxic characteristics.

Stability under operating conditions.

(d) All refrigerant lines, including fittings, shall be capable of withstanding a pressure of three times that provided in the above table, Section 7 (a), or that provided by special ruling in accordance with Section 7 (c).

8. (a) Each refrigerator cabinet shall be rigidly secured in place.

(b) Each refrigerator cabinet shall be provided with its own evaporator and it shall not be permissible to serve more than one cabinet with the same evaporator.

9. (a) Each compressor shall be provided with a device that will automatically stop the compressor at a pressure not to exceed the maximum provided in Section 7 (a) of this Ordinance or that provided by special ruling in accordance with Section 7 (c) of this Ordinance. This shall not apply to machines having a liquid receiver capacity not in excess of 12 pounds of refrigerant and which are so designed as to not permit a pressure in excess of that provided in Section 7 (a) of this Ordinance, or that provided by special ruling in accordance with Section 7 (c) of this Ordinance.

10. (a) Refrigerant lines, when exposed, shall be conspicuously marked or labelled so as to plainly indicate their contents.

(b) Printed instructions covering the operation and maintenance of the system and what to do in emergency shall be permanently posted at riser control valve manifold. All valves in manifold or distributing boxes at compressor locations shall be numbered and a schedule indicating the apartments that these valves serve shall be posted near the compressor.

(c) Each compressor shall be labelled with the trade name of the refrigerating equipment, same to be stamped or painted on the compressor or on a sign in a prominent location in the room housing the compressor.

11. All Multiple Refrigerating Systems not used for domestic or tenement purposes will be subject to the following exceptions:

(a) The distributing panel or manifold as provided for in Section 4 (e) shall not be required.

(b) Service valve connections as provided in Section 6 (b) shall not be required.

(c) All refrigerant lines must be pro-

tected against mechanical injury in the manner and as provided for in Section 4 (c), except that the metal boxes for protecting the distributing panel or manifold may be eliminated.

(d) It shall not be required to rigidly fasten each refrigerator cabinet in place as called for in Section 8 (a) where such refrigerator cabinet weighs in excess of 100 pounds.

(e) Each refrigerator cabinet may be provided with one or more evaporators and may be used for the service of one or more persons.

(f) A modification of Section 10 (b) shall be permissible to the extent that it will not be necessary to number the shut-off valves, but it shall be necessary to post at the compressor location in plain view a schedule indicating the refrigerator or refrigerators which are connected to the compressor.

12. The person, partnership, company or corporation installing a Multiple Refrigerating System shall within twenty-four hours after such system has been placed in operation, notify the proper authorities who shall, within forty-eight hours after receipt of such notice, make a suitable test of such system for refrigerant leaks and inspect the mechanical installation, as provided for in this Ordinance.

After such inspection has been made, the proper authorities will issue to the person, partnership, company or corporation having applied for the Permit, a Certificate of Acceptance, providing it passes inspection.

In the event of the rejection of any Multiple Refrigerating System, due to its failure to meet the requirements of this Code, the person, partnership, company or corporation having installed the same shall be required to make the necessary corrections within a period of five days after notification of its failure to pass inspection and upon completion of such corrections, will apply to the proper authorities for a second inspection.

13. Any person, partnership, company or corporation installing Multiple Refrigerating Systems shall be required to pay to the proper authorities a license fee of \$2.00 per year.

14. The proper authorities shall charge and collect from any person, partnership, company or corporation to whom a license to install Multiple Refrigerating Systems shall have been granted the following fees:

For issuing of permit.....\$1.00
For inspection of work the sum of
5c per evaporator.

Operates G. E. Commercial Unit In Restaurant At Cost Of 41 Cents Per Day

B. L. Biggerstaff, owner of Barnett's restaurant in Chatham, N. Y., states that he operate a commercial model General Electric refrigerator in his restaurant at the cost of 41 cents per day. The refrigerator is kept in the kitchen and used mostly to store a large amount of meat which is kept on hand at all times, as well as milk, vegetables and salads.

In the course of a working day, the refrigerator door is opened approximately 350 times. Although the temperature of the kitchen is 80 degrees and above most of the time, the refrigerator is kept operating at a temperature between 38 and 42 degrees at the low cost of approximately 41 cents a day.

Uses Frigidaire Cooled Case In Rustic Flower Store

A unique floral store in Kingston, N. Y., is equipped with a Frigidaire cooled display case, set into a sturdy, rough-hewn framework. Rustic palings at the store entrance, a floor of irregular flagstones, a fountain in a cobblestone pool, a vine grown overhead trellis, and indirect lighting help to create the impression of a garden. The owner, Joseph Schiavone, has called this shop "The House of Flowers."

Houston Frigidaire Distributor Opens Branch Store

Cox and Blackburn, Frigidaire distributors in Houston, Tex., and the immediate trade territory, have opened a branch store at 327 West Nineteenth avenue, in the new (Houston) Heights theatre building.

J. Russell Wait Succeeds L. E. Bauer as Head of Indian Motorcycle Co.

J. Russell Wait has been elected as president of the Indian Motorcycle Co., Springfield, Mass., to succeed Louis E. Bauer.

Electric Device Co. Acquires Warehouse Facilities

Electric Device Co., distributor of General Electric refrigerators in Springfield, Mass., has expanded its quarters by taking over a store for warehouse purposes alongside its show room at 119 Dwight Street.



The Door to Service

In the purchase or specification of automatic controls there is a definite consideration beyond the service that the goods themselves provide—the service which is rendered by the control manufacturer.

That service, with us, begins before there is an actual purchase. Engineering help is available for the solution of your control problems—and that service continues with a national distribution system to give you prompt delivery. Furthermore adequate personal contact gives you the advantage of our control experience at all times.

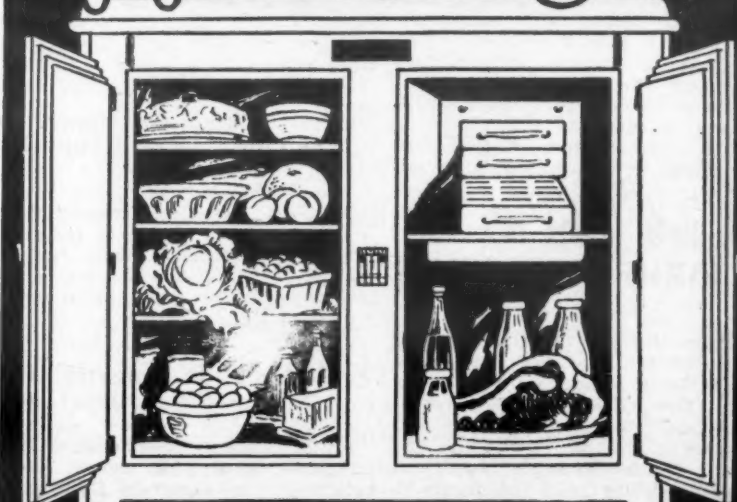
We appreciate the necessity of service—prompt, efficient and thorough-going in every particular. Our door is truly the door to service, before, during, and after the purchase of Time-O-Stat products.

TIME-O-STAT CONTROLS COMPANY
ELKHART, INDIANA

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Time-O-Stat Corporation Leachwood Company

Manufacturers of AUTOMATIC CONTROLS for
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Mechanical Stokers • Industrial Ovens • Ice Machines • Unit Heaters • Water
Heaters • Also Sign Flashers • Mercury Switches • Electric Heaters • Corrugated
Metal Bellows

Wayne Electric Refrigerator



Every Day—

Thousands of men and women are going into stores like your own to see what's new in Electric Refrigerators! And many of them are asking about the new Wayne ... with its Automatic Cold Control!

If you are interested in this Wayne Feature ... and the profitable Wayne Franchise ... Write Us.

WAYNE HOME EQUIPMENT CO.
Main Office and Factory, Fort Wayne, Ind.

Holmes Men Enjoy Cooling Breezes While Attending First Convention at New York City



Fifty Holmes distributors and dealers attended the first annual convention held by Holmes Products, Inc., at the Hotel Commodore in New York City on June 19. Shortly after the meeting the entire party boarded the steamer "Hook Mountain" and made the trip to Bridgeport, Conn., to inspect the manufacturing facilities used in the production of the Holmes electric refrigerator.

A fast delivery,
a clean delivery, and a
delivery costing less . . . always

The experience of many refrigerator dealers with the Webb Slingabout warrants this statement

Since its introduction to the trade some twelve or thirteen months ago the Webb Slingabout has proved itself of value in increasing net profits by lessening expense.

A heavy canvas jacket thickly padded with cotton and lined with flannel—and a harness of 3-ply canvas belting, sewed and copper riveted at the connections and re-enforced at the buckles by $\frac{1}{8}$ " sole leather—the Slingabout is the ideal device for insuring safe and economical delivery to the consumer.

It protects the refrigerator's fine finish—even delicate porcelain—against marring. It protects the home into which the delivery is made. It facilitates handling, and makes pos-



sible more deliveries per working day. And it is so tough and durable that it will serve time and time and time again.

Slingabouts are made for every type and size of refrigerator. Tell us what line you handle and we will quote you prices. Charles J. Webb & Company, 116 Chestnut Street, Philadelphia, Pa.

WEBB
Slingabout

BOSTON KELVINATOR FIRM TO FIGHT CONDITIONAL BILL OF SALE STATUTE

Choate, Hall & Stewart, Boston, Mass., on behalf of the Kelvinator Corp. of Delaware, doing business in Boston, Mass., have brought a writ of mandamus in the Supreme Judicial Court to compel T. A. Fitzgerald, register of deeds of Suffolk County, to receive and record a conditional bill of sale of personal property, namely an electric refrigerating system.

The petition asking for the writ of mandamus states that on June 18 the Kelvinator company presented for record to John W. Johnson, assistant register of deeds for Suffolk County, a notice of a conditional bill of sale of property known as the Kelvinator refrigerator system to be installed in 30 apartments at 50-52 Columbia Road, Roxbury.

The paper was filed in accordance with the provisions of Section 13, Chapter 36, of the General Laws, but Mr. Johnson refused to receive and record the sale on the grounds that the described property was not of the kind allowed by the statute to be recorded as attached to real estate. Judge Carroll will hear the case during July.

FEDERAL SODA FOUNTAIN CO. ACQUIRES HOLDINGS IN BASTIAN-BLESSING CO.

The Federal Soda Fountain Co., Boston, Mass., has acquired a large block of common stock of Bastian-Blessing Co., Chicago, Ill., manufacturers of soda fountains and carbonating machinery. The Federal company will handle Bastian-Blessing products in New England territory, where the Chicago concern hitherto has not been represented.

Additional business to the extent of \$400,000 is expected from that section, Lewis G. Blessing, vice-president, stated.

DEALER, HELD LIABLE IN DAMAGE SUIT, BANKRUPT

The Home Heating & Refrigerating Co., 325 Fairfield Avenue, Bridgeport, Conn., has been adjudged involuntarily bankrupt. The petition against the company is brought by Clark R. Force and Margaret Force Fromme, now of Los Angeles, Cal. The action is the outgrowth of the trial resulting from the deaths in Danbury, Conn., in 1927, of Warren Force Fromme and Frank W. Force

caused by escaping gas from an apartment house refrigerating system.

Note—This and the Chicago case, discussed elsewhere in this issue are the only ones, of which the News has any record, in which a coroner's jury has attributed death to the effects of gas escaped from an electric refrigeration system.—Editor.

The petitioners for involuntary bankruptcy are beneficiaries of the judgment handed down at that trial by Judge Allyn L. Brown. It is now claimed that there remains unpaid a total of \$19,000 of the judgment, also costs and interest. It is also claimed the Home Heating & Refrigerating Company has been insolvent and while so transferred properties to persons including the company's president, Millard T. Gardner, and its secretary, Lena M. Johnson.

ELECTROLUX DEALER CATERS TO CHURCH ORGANIZATIONS IN CINCINNATI, OHIO

A new sales field for gas refrigerators has been successfully developed by the Anour Co., Cincinnati, Ohio. The Electrolux El 20 model is being featured as an ideal Koshier cabinet for orthodox Jewish families. An advertisement appearing in *Every Friday*, a Jewish weekly going into 16,000 Cincinnati homes, carried an endorsement by Rabbi B. Epstein.

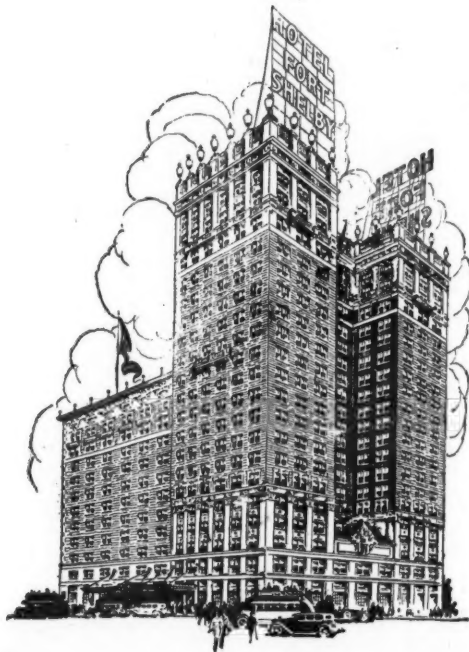
During May, the *Catholic Woman's Monthly Magazine* of Cincinnati contained an advertisement bearing the endorsement of Father Selfert. According to C. H. Arnold, sales manager of the Anour Company, the same plan is contemplated in connection with many other religious organizations throughout the city. "We are also interesting church and other societies," said Mr. Arnold. "During April, we had more than two hundred women visit our showroom."

Detroit Frigidaire Branch Holds 2nd Cold Control Exhibition

The Detroit branch of the Frigidaire Sales Corp., conducted a second cold control exhibition at its sales room in the General Motors Bldg. from June 25 to July 3. At this time the production of the millionth Frigidaire unit was celebrated in Detroit.

Norge Dealer in Longview, Wash., Moves to New Quarters

Norge Electric Refrigeration Co., of Longview, Wash. has moved from the building of the Longview Electric Co., to new sales and display quarters in the Daily News building on 12th Ave.



Corner of
Lafayette and First
Look for the large green
sign on the roof

To those who visit DETROIT

Experienced travelers look forward with pleasant anticipations to arrival in Detroit because of Hotel Fort Shelby's sincere hospitality, its complete facilities, and its high degree of comfort, convenience, and quietude. This 22-story hotel, with 900 reposeful, Servidor-equipped guest rooms and four excellent restaurants, is the favored stopping place of those whose standards of living are upon a high plane. All downtown Detroit is practically at the door.

Whether your choice be one of the many excellent rooms at \$3, \$3.50, or \$4, or one of the higher-priced, larger, more elaborate rooms or suites, you will enjoy a particular sense of value in the Fort Shelby. Guests arriving by motor are relieved of care of their cars at the hotel entrance by competent attendants. You are invited to avail yourself of the hotel's services in advance reservations of tickets to theaters, operas, concerts, sporting events, etc. Write for fully illustrated folder.

HOTEL FORT SHELBY DETROIT

MAYNARD D. SMITH, President

J. E. FRAWLEY, Managing Director

Every Cylinder Analyzed **SULPHUR DIOXIDE**
Absolutely Pure for DIRECT CHARGING
Bone Dry

also Ton Drums
Tank Cars

ANSUL CHEMICAL COMPANY
MARINETTE WISCONSIN

DEMONSTRATION METHODS

Cleveland Electrical League Gets Fine Response In Local Food Preservation Campaign

Sponsors Exhibits and Gives Talks on Refrigeration to Women's Clubs

USE of temporary exhibits at various population centers of Greater Cleveland as a means of promoting the sale of electric refrigerators is being pioneered by the Electrical League of Cleveland.

One community exhibit already has been held. It closed after a month's successful run. The second exhibit now is in progress. A third and fourth exhibit will be organized later in the year.

The exhibits are held in stores rented expressly for the purpose in strategic neighborhood centers. Each exhibit runs for a definite period—a month to two months, depending on the response of the local population.

Aim of the exhibit is to spread information about electric refrigeration and to break down primary sales resistance, thus putting the prospect in a receptive frame of mind for the salesman. No direct selling is done at the exhibit itself, nor are any orders taken.

Cleveland distributors of electric refrigerators, however, have reported that the exhibits have been productive of many sales. Prospects, sold on the merits of electric refrigeration at the exhibit, often go directly to the headquarters of the distributor and purchase refrigerators.

Four Makes Cooperate

Cleveland distributors of four makes of electric refrigerators are co-operating with the League in its program. The refrigerators represented are Frigidaire, General Electric, Kelvinator, and Westinghouse.

J. E. North, president of the Electrical League, is the author of the community exhibit idea. Details were worked out with the collaboration of the League's electric refrigerator committee and electric ironer committee.

"For nearly four years the Electrical League has maintained at its headquarters a permanent exhibit of everything electrical for the home," North told a representative of *ELECTRIC REFRIGERATION NEWS*. "This exhibit has been highly successful."

"At the beginning of this year we decided to extend the exhibit idea by holding temporary exhibits in outlying community centers. Instead of showing all electrical appliances, however, we decided to concentrate on electric refrigerators and ironers—two items which seem to lend themselves admirably to intensive promotion work."

"Each of these exhibits, so far as the refrigeration division is concerned, consists of two parts. The first is an operating exhibit of electric refrigerators, furnished by the co-operating distributors. The second is a lecture room, seating 50 people, in which talks on food preservation may be given."

Show How to Economize

"To secure audiences for the food preservation we can show how homemakers can set a better table for less money."

"A definite appointment is made for each group to visit the exhibit. The refrigerators on display are examined by the group and their operation explained by attendants. Then the talk on food preservation is given."

The food preservation talk, especially prepared for use at the league's exhibits, opens with a brief description of the historical development of food preservation.

It then goes into the subject of food spoilage, explaining in a non-technical manner the way in which bacteria cause decomposition and how the activities of bacteria may be halted.

As a climax, the talk explains that bacteria cannot function in a cold, dry atmosphere. Then the talk explains how such an atmosphere can be assured through the use of electric refrigeration.

Since North's idea was entirely new, he was obliged to hire and train personnel especially for the work. He selected young women with intelligence, good appearance, and ability to speak before groups. He then put them through an intensive course of training in the fundamentals of household refrigeration.

"The League feels that the community exhibit idea has proved its merit," North said.

"Members of women's groups as well as individuals who are drawn to the exhibit by the window display or through our advertising campaign have been thoroughly impressed with the need for efficient refrigeration."

"Two thousand attended our first ex-

hibit in the four weeks it was open. Since our present exhibit has not yet closed, we cannot provide attendance figures.

"Many leaders of women's clubs referred to our food preservation talk as one of the most interesting household lectures they had ever heard at a club meeting."

The talk which has created this interest is given approximately as follows:

FOOD PRESERVATION

Ten Cents Out Of Every Dollar Spent For Food Is Consigned To The Garbage Can

ONE-TENTH of all the food purchased by American families finds its way into the garbage pail. In this I do not include the peelings of fruit, the bones of meat and other parts of food which naturally have to be thrown away. I mean that one-tenth of the edible portions of food purchased by American families is wasted through spoilage.

If you would keep a careful record and either weigh or measure all of the berries, spots from apples, tomatoes and all of the small quantities of milk, cheese, meat and all of the left-overs which have to be thrown away each day, you will be surprised to learn that ten cents out of each dollar spent for food is wasted in most homes.

This statement does not come from any one's imagination but is the result of a careful investigation made by U. S. Government experts.

While the waste may be more or less in each home, the average is ten cents out of each dollar, and the average amount of money wasted by each family each year is \$60.00 or more.

Just think of the many nice things one could buy for sixty dollars.

However, this waste of the family's funds is not the most serious indictment which can be laid at the door of faulty food preservation. After all, money lost can be replaced, but food spoilage robs us not only of money but also health, and the latter is not so easily regained.

Of course, no homemaker knowingly consumes or offers to others, food which has been tainted. But very often it is impossible to ascertain whether food has been tainted or not, because the homemaker cannot be at one time a trained nurse, physician and chemist. She cannot spend her day with one eye glued to a microscope.

Therefore, the amount of sickness caused by the unwitting consumption of tainted foods is appalling. The ravages of such maladies as ptomaine poisoning are known to all of us. Mothers also are aware of the fact that tainted milk and other foods are the cause of intestinal disorders in infants.

In brief, inadequate food preservation is doing a great deal to create the volume of sickness which costs the people of Cleveland an average of twenty dollars a year for each person or a total of twenty million dollars annually for doctor bills alone. And improperly preserved foods are playing an important role in bringing about the annual toll of premature deaths.

In the light of the facts I have just given to you, I believe that all here today will admit that food preservation in the home is a matter so vital that it deserves the serious consideration of every woman to whom the management of a household is entrusted.

And this importance of food preservation has been realized instinctively by human beings since the earliest days of the history of our race. Mankind through the centuries has groped for a method of food preservation which would protect him against loss of both food and health. But only recently, as we shall see, have man's efforts in this direction been wholly crowned with success.

The food preservation problems of cave-man ancestors were much more simple than our own.

Game was abundant and there was no need to keep food for any long periods of time; however, even the cave man

found it worth while to keep food near a spring of cold water or in some dark, cool recess of the cave.

When an American thinks of primitive man, his mind always turns to the Indians. These savage people also had to develop a method of food preservation. When Indians were on the war path, or when the tribes were moving from place to place, it often was inconvenient to secure a supply of fresh meat by hunting.

Indians Preserved Meat in Buffalo Skins

The squaws dried cuts of meat over a slow fire, pulverized it and placed it in sacks of buffalo hide. This preparation—so hard that it would defy the teeth of us moderns, was eaten by the early frontiersmen and explorers of our country as well as by the red tribes.

Every advance of civilization has intensified the food preservation problems. Especially was this true when people began for the first time to congregate in cities.

Egyptians Cooled Water To Obtain Refrigeration

The wise men of ancient Egypt studied the problem of food preservation and solved it after a fashion of cooling water with fans.

Mediterranean Peoples Preserved Foods By Drying

Other Mediterranean peoples preserved food by drying.

Street of the Salt Merchants of Ancient Rome

Very early in the history of civilized man, salt was used for the preservation of food. This practice survives today and many hundreds of pounds of salt fish and other salted products are being sold daily in modern Cleveland.

The great drawback of this system, however, is that many foods are rendered unpalatable by the addition of salt. This, for instance, is the case with wine.

Roman Slaves Carried Snow to Cool Nero's Wines

Therefore, in classical days slaves were obliged to carry snow down from the mountain peaks to cool the wine which was consumed by the tyrannical emperor, Nero.

Oriental peoples in very early times began to preserve food by spices. This was the most common method of food preservation throughout Europe in the Middle Ages.

Demand For More Spices Drew Columbus To America

The demand for spices was one of the factors which encouraged Columbus to sail West in an effort to establish contact with the Indies.

Another method of food preservation which we all employ to some extent is canning.

Canning Developed For Use Of Napoleon's Troops

This method first was invented for use of Napoleon's troops.

In Spring Houses Running Water Carried Away Heat

The early settlers in America evolved many methods of food preservation which still are employed by residents of rural communities. One method—more picturesque than effective—is the placing of foods in spring houses where cool, running water chills them.

This brings us down to modern times. And I want you to bear in mind the fact that the problem of food preservation today is greater than ever in the past. During the last half-century there has been going on a vast concentration of people in cities. The result is that the cities of today are much larger and the density of population in these cities vastly greater than ever in the past.

And, quite naturally, we people are more remote from our sources of food supply than were our ancestors in days gone by. We no longer secure our meat by hunting nor yet by growing our own livestock. We do not secure milk from our cows nor eggs from our own poultry yard. We do not grow vegetables or fruits on our own soil. Instead, all these foodstuffs, originate at comparatively distant points—often thousands of miles away—and are passed through several groups of tradesmen before they reach our homes.

This, in itself, need cause us no worry. All foods are carefully watched at each handling stage and tradesmen take every precaution to bring them to us in perfect condition. Besides, the handling of foods in commercial institutions is regulated with the utmost strictness by federal, state and local laws.

Foods Protected From Source To Consumer

Therefore, even the most careful housekeeper may rest assured that foods when delivered to her are fit for consumption by her family. It is the home which is the weakest link in the chain which stretches from the source of foods to the table where it is consumed. Modern science has placed in our hands an instrument which makes it possible for us to turn this weak link into a link as strong as any of the others.

It is logical to ask what causes food

This is a National Message to the American Housewife

Good Housekeeping Institute

Recommends Proper arrangement of foods in your refrigerator, and protection. There is a big difference—to get the most good out of your refrigerator are you using both KVP Refrigerator Papers?

There's Household Parchment for cooking and for wrapping all greasy, moist and wet foods—it's boil-proof—it wears—use it again and again. KVP Heavy Waxed Paper "Cutter Box" seals tight (one sheet will do)—keeps the moisture in or keeps the moisture out as desired. Remember, all foods should not be wrapped in Waxed Paper—for 100% results use the famous pair of KVP food wrapping and cooking papers.

Try your Grocer, Stationer, Hardware, Department Store and Neighborhood Merchant first; if they cannot serve you, KVP will pay the parcel post.

Send \$1.00 for the two big 50c rolls (West of Missouri and South Coast States, 60c per roll, both for \$1.20 postpaid).

FREE When ordering, mention this ad for a Miracle Paper Dish Rag and interesting samples for you and your friends.



STANDS FOR "THE WORLD'S MODEL PAPER MILL"

KALAMAZOO VEGETABLE PARCHMENT CO. KALAMAZOO MICHIGAN U.S.A.

MANUFACTURING WORLD-WIDE FAMOUS FOOD PROTECTION PAPERS

If you are in any way interested in Electric or Gas Refrigeration... read the above over twice because it will mean much to you... this is our National message to the American Housewife in cooperation with your refrigerator sales campaigns. Write for samples and advertising ideas that sell your refrigerators to new customers and keep old customers interested.

Drastic Price Reductions

ON

BOHN all-porcelain base cabinet models

WHITE PORCELAIN, OUTSIDE AND INSIDE

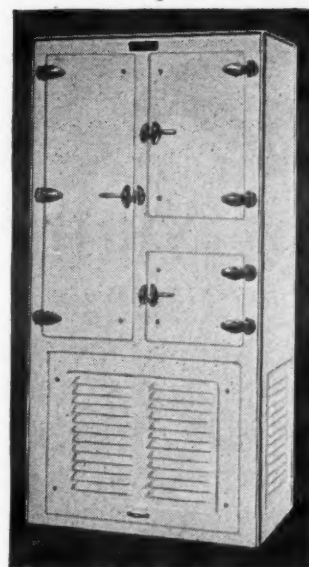
5, 6, 7, 9 and 12 Cubic Feet of Food Storage

The handy base cabinet may either be used for refrigerating machinery or the storage of cooking utensils, canned goods, vegetables, etc.

These beautiful BOHN refrigerators, with their heavy insulation, sturdy general construction, and patented air-circulating principles, are an assurance that your units will render perfect refrigeration and do so economically.

Write for details of these remarkably low prices.

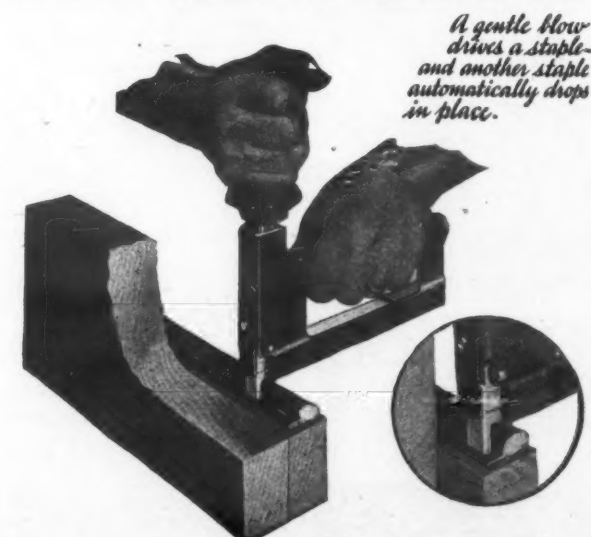
Many models for remote installation are also greatly reduced.



Bohn is the World's Largest Builder of Quality Refrigerators

BOHN REFRIGERATOR COMPANY SAINT PAUL, MINNESOTA

The Markwell Automatic Method of TACKING GASKET ON REFRIGERATORS



A gentle flow drives a staple and another staple automatically drops in place.

SHIPPED ON 10 DAYS TRIAL

Should be in the tool kit of every installation man, service man, repair man.

8 TIMES FASTER—MORE SECURE

MARKWELL NO. 176

AUTOMATIC REFRIGERATOR TACKING MACHINE

\$7.50 Each

STAPLES PUT UP 5,000 TO A PACKAGE

176 "B" Steel, per pkg. \$2.75 176 "BTC" Copper, tin plated, per pkg. \$3.25
176 "BC" Copper, per pkg. 3.75 176 "BM" Monel, per pkg. 5.50

PRICES ON STAPLES IN QUANTITY ON APPLICATION

Prices are F. O. B. New York

R. N. E. MARKWELL MFG. CO. INC.

200 Hudson Street

New York, N. Y.

Takes Over G. E. Agency in Watford City, N. D.

The Moe Motor Co. Watford City, N. D., has recently taken over the agency for General Electric refrigerators in McKenzie county in North Dakota.

A GOOD COOLER DOOR IS MADE BETTER WITH—



Wirfs PATENTED "AIRTITE" GASKET

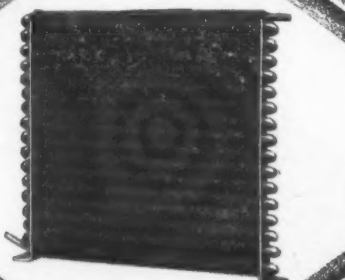
Write for samples and prices, today.

Wirfs Corporation
135 S. 17th St. - St. Louis, Mo.

McCORD BUILT CONDENSERS



* Type "B" Spiral Fin Continuous Coil McCORD CONDENSER
The popular "bee hive" condenser designed to occupy a minimum of space. It is installed so that all air currents created by the fan pass over the coils giving great capacity with a small amount of tubing.



Type "A" Double Row Spiral Fin McCORD CONDENSER
Adapted to the larger refrigerating units used commercially and for apartment house installations. This condenser is made up of seamless, bright annealed tubing with continuous corrugated spiral fin that has made McCORD condensers leaders in the field.



Type "A" Triple Row Condenser McCORD CONDENSER

McCORD RADIATOR & MFG. CO.
DETROIT MICH.

FOOD AND HEALTH

CLEVELAND LEAGUE SPONSORS TALKS ON FOOD PRESERVATION

(Concluded from page 21, column 3)

spoilage. I shall answer that question for you. And after we have found the causes of food spoilage we shall be ready to learn how these causes may be removed.

How Mould Looks Under The Microscope

In general, there are three things which cause food to "go bad." These are moulds, yeast growths, and bacteria. Moulds are tiny plants which grow on the surface of food substances. When the growth of mould has progressed to a considerable extent, the mould is visible to the naked eye and the food on which it is growing is rejected. But the early stages of mould growth are not visible for 36 hours except under the microscope. Therefore, foods tainted with mould often are consumed and the consequence is digestive disorder or perhaps some more serious disorder.

Causes of Food Spoilage, Mould, Yeast, Bacteria

Yeast likewise is made up of millions of tiny organisms, visible only under powerful microscopes. While commercial yeast may be taken into the system pure or in combination with other foods, and bring beneficial results to the system, many foods tainted with rank yeast growths are considered unfit for human consumption.

Far more dangerous, however, than either mould or yeast, are many varieties of bacteria which thrive on perishable foods, such as meat and milk. These bacteria are microscopic animals. They are infinite in variety. Some do no harm to the human system, but others are the direct cause of such scourges as ptomaine poisoning, tuberculosis, typhoid fever, intestinal disorders, and many other types of illness.

Now, if we are to protect the health of our families, it is obvious that we must deal a blow to all these three classes of food contamination agents—to moulds, to yeast, and to bacteria. Luckily for us, all these enemies to health thrive under roughly the same conditions. And, inversely, we can employ the same methods to halt the growth of all three classes in our family foods and render them harmless.

In order to spoil food and work havoc to the health of those who consume the food, moulds, yeasts and bacteria must be active and must multiply. To be active and multiply they require a favorable environment. A favorable environment for these destructive agents consists of two things. The first is heat. The second is dampness.

Let us consider the factor of heat alone.

Let me tell you what the United States Government found out through tests with milk.

Three samples of fresh milk were taken from a container. The temperature of sample "A" was kept at 50 degrees Fahrenheit, the temperature of sample "B" was kept at 60 degrees, and the temperature of sample "C" was kept at 70 degrees.

After 96 hours, the bacteria in each sample were counted, and it was found that one-fourth of a teaspoon of milk taken from sample "A" contained 19,000 bacteria, sample "B" which had been kept at 60 degrees, contained two thousand times as many bacteria as sample "A," and sample "C" which had been kept at 70 degrees, contained 50,000 times as many bacteria as sample "A."

With this information we can readily understand why the temperature of milk should be kept below 50 degrees.

Vegetation In Summer—Vegetation In Winter

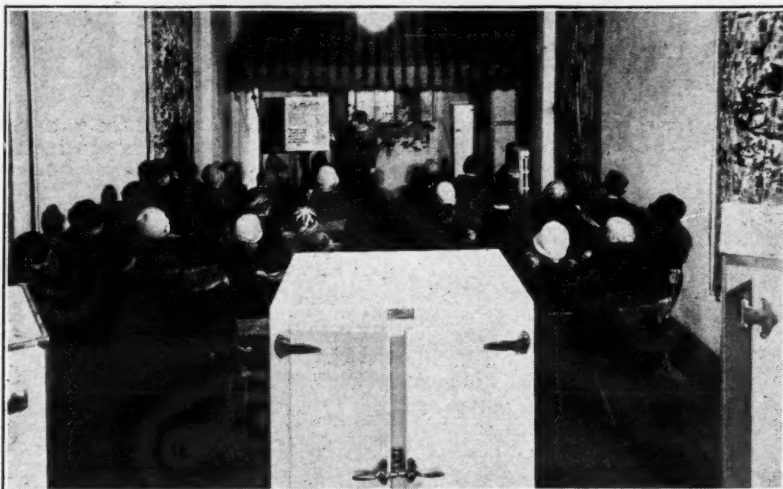
Moulds and yeasts, as we have seen, are plants and, in general, they react to surrounding conditions in much the same manner as other plants. All plants—trees, shrubs, and grass—flourish luxuriantly and multiply in warm weather. In the winter, however, these same plants drop their foliage, cease to multiply, and, so far as exterior appearance is concerned, actually die.

Vegetation In Summer, Above 50 Degrees Mould Plants—Vegetation In Winter, Below 50 Degrees, No Mould

This same thing is true also of yeasts and moulds. When foods are exposed to temperatures higher than 50 degrees, moulds and yeast grow just as luxuriantly as do trees and grass in summer. But when the temperature drops below 50 degrees, moulds and yeast become just as withered and inactive as trees in winter.

Trees, of course, do not actually die in winter. They simply become inactive. When the air warms up they come to life again. The same thing is true of moulds and yeasts. And this is a fact which the careful homemaker must bear in mind. The foods must be kept constantly at a low temperature and in a

A Typical Gathering



Showing Group Listening Attentively to the Food Preservation Lecture

dry atmosphere until they are ready to be cooked and consumed.

We have seen how heat stimulates the activity, growth and multiplication of yeasts and moulds which are plants. What about bacteria which are animals? The same thing is true of them. Bacteria, we must remember, are low forms of animals and follow the same laws of existence as other low forms of animal life.

Frogs bury themselves in autumn and as the temperature drops, every outward appearance of life leaves them. It is difficult for scientists even to detect the beating of these creatures' hearts. But when the temperature rises in spring, these creatures come out of their torpor, become very lively, and multiply.

Bacteria behave in exactly the same way. While the temperature is higher than 50 degrees, they can be seen under the microscope, propelling themselves about in a lively manner. When the temperature is below 50 degrees, however, bacteria sink into a torpor. They move little or not at all. They do not multiply. And, under such conditions, they work no injury to the human system.

Now keep this truth in mind: *Organisms which cause food spoilage and injure health, are active and multiply freely at temperatures greater than 50 degrees. At temperatures lower than 50 degrees, they become dormant and harmless.*

Freezing Injures Most Foods

While it is important to keep foods at a temperature below 50 degrees, it is also important to keep them above freezing temperature, which is 32 degrees.

Freezing, as you know, renders a great many foods unpalatable. But worse than that, it breaks down the cell structure of most foods with the result that bacteria can multiply very rapidly in the broken down cells as soon as the temperature rises, just as bacteria can multiply readily in a cut, bruise or wound on the surface of the body.

This proves to you that outdoor temperatures will not preserve food.

Nature Supplies An Average Of 19 Days Refrigeration A Year

Indeed, the Government Weather Bureau has compiled figures which prove that in the country at large there are only 19 days in the year when outside temperatures are correct for the preservation of food. In Cleveland there are only 25 such days in a year.

Now, as I have told you, there is another factor besides temperature which favors the growth of destructive microorganisms—and this is dampness.

Little Vegetation Appears Upon The Desert—Through Irrigation The Desert Becomes Fertile

Why dampness is favorable for the growth of moulds, yeasts and bacteria is easily understood. Consider the appearance of a desert. It is a wide stretch of sand. Either no vegetation at all or only the sparsest vegetation can be seen. All except a few species of animals shun the desert. But, if the desert is irrigated—that is, made wet—vegetation begins to grow in profusion and animals soon make their appearance.

Through Irrigation The Desert Becomes Fertile—Damp Atmosphere—Mould

In the same manner moulds and yeast, the plants of the microscopic world, and bacteria, the animals of this same world, do not thrive in a dry atmosphere, but wither and die.

Now, if you keep clearly in mind the facts I have given you, it is obvious to you that in order to preserve the food of your family properly, to avoid expensive wastage and safeguard the family's health, it is necessary for you to use a refrigerator which will do two things:

1. Keep your foods constantly at a temperature below 50 degrees and above the freezing point, 32 degrees,
 2. Keep your foods in a dry atmosphere.
- Both these things are accomplished—and accomplished very thoroughly and

efficiently by the electric refrigerator, several types of which you see on display here today. The entire interior of the electric refrigerator is kept always at a temperature lower than 50 degrees and the cold produced by the electric refrigerator is dry cold.

Once the electric refrigerator is installed and the motor connected to a convenience outlet, it requires but little attention except for the customary cleaning of the interior.

The foods may be placed in the refrigerator or removed at will, and the automatic device which controls the operation of the mechanical equipment will start and stop the motor to maintain the average temperature desired.

Many owners of electric refrigerators buy fruit, vegetables and eggs in quantities to last for an entire week, and meats may be preserved for comparatively long periods.

Because of the unchanging low temperature and dry atmosphere of the electric refrigerator, food spoilage is reduced to the vanishing point and even the most perishable of food-stuffs may be kept pure and sweet for long periods.

Eggs can be purchased by the case and kept fresh until used. Several days' supply of milk, cream and other dairy products will remain sweet and palatable, while fruit and vegetables will remain crisp and fresh indefinitely.

The advantages of such an efficient refrigeration medium as this are obvious. Some of the most striking of these are:

Electric refrigerators are supplied with one or more small trays in which an abundant supply of ice cubes can be frozen for table use.

Then, by removing the divider, the trays may be used for preparing frozen desserts, such as creams, mousses, and sherbets, or they may be used to prepare frozen salads.

Electric refrigerators may be purchased as self-contained units, in which case it is necessary only to connect the refrigerator to a convenient outlet to put it in operation. When the family moves, the electric refrigerator can be taken away as readily as any other piece of furniture with equal bulk.

It is possible, also, at the option of the family, to purchase a refrigerator, the operating parts of which can be installed in the basement while the refrigerating cabinet proper in on the ground floor.

The operating cost of an electric refrigerator will depend upon:

- (a) The amount of space in the refrigerator to be cooled.
- (b) The quantity of food to be cooled.
- (c) The number of times the doors are opened.
- (d) And the average temperature of the room in which the refrigerator is placed.

In any event, the cost of operation should not be more than one-half of the cost of food which spoils, and finds its way into the garbage can because the food is not kept at a temperature below 50 degrees.

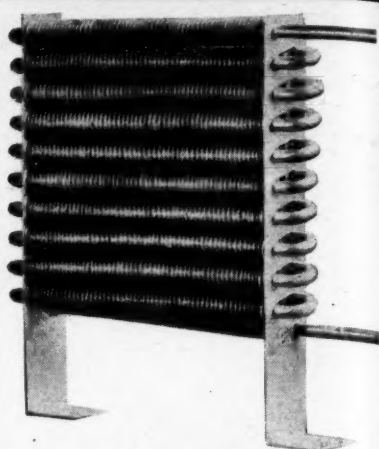
Health—Happiness—Economy

Now in closing, just let me remind you that—

1. According to Government surveys, ten cents out of each dollar spent for food is wasted.
2. I have explained to you the cause of food spoilage.
3. Necessity—the mother of invention has provided the ideal equipment, the Electric Refrigerator, to save your money, protect your family's health, and give you a modern convenience to which every woman is entitled.

General Electric Refrigerator Breaks Into the Movies

A General Electric refrigerator from the George Belsey Co., Los Angeles, distributors, has broken into the movies. The play is a Warner Brothers talkie and is entitled "The Time, The Place and The Girl." Betty Compson and Grant Withers, are luminaries in the picture.

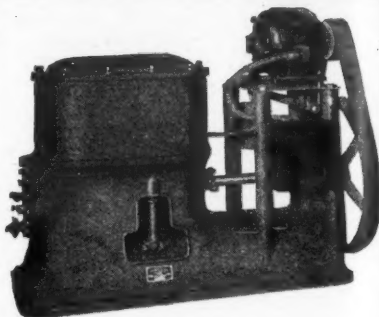


Specify ROME CONDENSERS

Made of heavy gauge de-oxidized seamless copper tube. One piece construction.

Designs for all requirements

Rome-Turney Radiator Co.
ROME, N. Y.



Electric Refrigeration Distributors and Dealers

You need the PEERLESS line of compressors.

PEERLESS units give you a COMPLETE line, ranging from one to ten tons.

PEERLESS Perfected Multiple Apartment System is recognized leader in its field. Full details given on request. Our record warrants your most exacting investigation.

PEERLESS ICE MACHINE CO.
515 W. 35th Street
CHICAGO, ILLINOIS

FLINTLOCK CONDENSERS

Efficient — Economical Compact

Greater Efficiency at Less Cost

WRITE FOR OUR BOOKLET

FLINTLOCK CORPORATION

4461 W. Jefferson Ave.
DETROIT, - - MICH.

BRUNSWICK-KROESCHELL REFRIGERATION

NOTABLE INSTALLATIONS



For the WORLD'S LARGEST HOSPITAL GROUP

The selection of Brunswick-Kroeschell Refrigeration for the Columbia Presbyterian Medical Center of New York is another indication of the completeness of the Brunswick-Kroeschell line.

Brunswick-Kroeschell Company manufactures equipment of capacities ranging from 500 lbs. refrigerating effect and up, using ammonia, carbon dioxide and methyl chloride as refrigerants. And back of it all is more than 32 years of continuous and successful application.

BRUNSWICK-KROESCHELL COMPANY
Refrigerating & Ice Making Machinery
NEW BRUNSWICK, N.J. - CHICAGO, ILL.

NEW DEALERS & DISTRIBUTORS

Recent appointments announced by manufacturers and new sales outlets reported from the field.

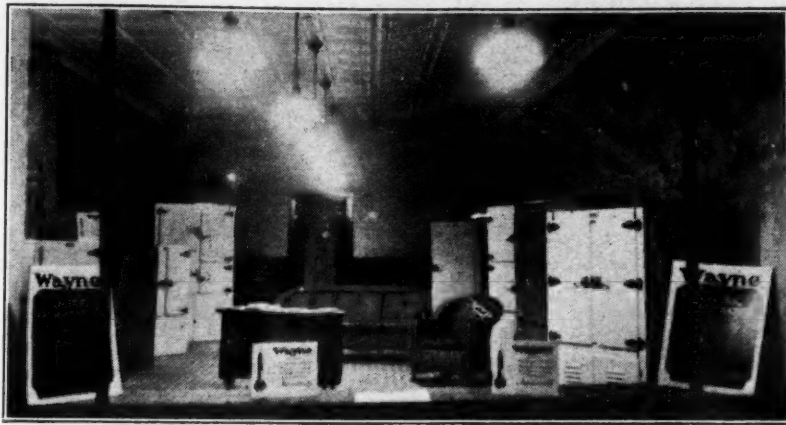
Copeland

Distributors:
George Campe, 1017 N. Alameda St., Los Angeles, Calif.
The Marion Electric & Furniture Co., 188 S. Main St., Marion, Ohio.
Swan Lumber & Supply Co., 231 Second St., Marietta, Ohio.

Dealers:

John B. Varick Co., Manchester, N. H.
Falls Tire Co., Great Falls, Mont.
S. Blum & Sons, 3535 Southport Ave., Chicago, Ill.
Lassers Furniture Co., Inc., 160-70 S. Schuyler, Kankakee, Ill.
T. P. Karcher, Lombard, Ill.
Millen Hardware Co., Wilmette, Ill.
Paul Blum, 7339 Constance Ave., Chicago, Ill.
J. G. Bostrom, Wray, Colo.
Lewis Weiss, Crown Point, Ind.
The Electric Shop, Greenfield, Ind.
E. S. Root, Hagerstown, Ind.
Dale Kelley, Hillsdale, Ind.
May Company, 8th and Broadway, Los Angeles, Calif.
Brinn & Parrish, 6304 Santa Monica Bldg., Los Angeles, Calif.
Bleeker Hardware Co., 809 S. LaBrea, Los Angeles, Calif.
Banning Electric, Banning, Calif.
L. A. Duncan, 2891 W. Pice, Los Angeles, Calif.
Elwood Gas & Appliance Co., 227 E. Broadway, Glendale, Calif.
Goodell & Proud, 200 E. Central, LaHabra, Calif.
Johnson & Lynch, Corona, Calif.
J. C. McArthur, Florida St., Hemet, Calif.
Orange Hardware, Anaheim, Calif.
Orange Hardware, Santa Ana, Calif.
Reed Hardware, Glendora, Calif.
Stead Electric Shop, 300 N. Citrus, Covina, Calif.
Thorn Copeland Sales Co., 510 "E" St., Bernardino, Calif.
Stanley P. Twomey, 14530 Irwin St., Van Nuys, Calif.
Graham Radio Co., Graham, Tex.
Kiel Electric Co., Monroe, Wis.
I. R. Johnson, William St., Albert Lea, Minn.
Ford Hardware Co., Maud, Okla.
Key Hardware, Wewoka, Okla.
George Neidermyer, Glassport, Pa.
A. J. Clevenger, Ontario, N. Y.
Crown Service Sta., 1700 Dewey Ave., Rochester, N. Y.
E. R. Sutter & Co., Eureka, Mo.
Quillie Mercantile Co., Wells, Nev.
Edwards Furniture Co., 24 S. Main, Logan, Utah.
George Isidore, Half Moon Bay, Calif.
Mt. View Hardware, Mt. View, Calif.
E. A. Franz Co., Hood River, Ore.
Jamison Hardware Co., McMinnville, Ore.
Stevens Chevrolet Co., Grangeville, Idaho.
White Brothers, Redwood, N. Y.
W. C. Dorbrandt, Athens, Tex.
Ford Electric & Radio Co., Jackson, Miss.
G. Johnson, Macon, Miss.
Jarrell Motor Co., Jarrell, Tex.
Electric Refrigerator Agency, Vancouver, B. C., Canada.
Johnson & Co., Riverview, Ala.
Standard Electric Co., Portsmouth, R. I.
Morris Kenner Co., 355-59 Weybosset St., Providence, R. I.
Strong Electric Co., Coleman, Tex.
McKenzie Sales & Service Co., Broadway and Champs, Denver, Colo.
E. E. Stillabower, Columbus, Ind.
Great Lakes Radio Corp., 436 Farwell Ave., Milwaukee, Wis.
N. P. Gores, Hampton, Minn.
Clapp, Rose and Vaughn, Inc., 31 W. Main St., Waterbury, Conn.
The Radio Shop, 25 Grand St., Waterbury, Conn.
Berry Electrical Co., 890 Utica Ave., Brooklyn, N. Y.
Rao Engineering Co., 99 Manaronek Ave., White Plains, N. Y.
New York Edison Co., New York, N. Y.
W. J. Elliot, 1244 Myrtle Ave., Brooklyn, N. Y.
Gould's Music Store, 37 Main St., Flushing, L. I., N. Y.
R. E. B. Service Corp., 3 162nd St., Flushing, L. I., N. Y.
M. S. Berkoff Co., 1402 Coney Island Ave., Brooklyn, N. Y.
Frank P. Foley, 12 W. Forham Rd., Bronx, N. Y.
Forest Hills Pkg. Supplies, Forest Hills, N. Y.
Woodside Utility Co., 58th St. and Roosevelt Ave., Woodside, L. I., N. Y.
Welfare Gas Range Co., 5001 New Utrecht Ave., Brooklyn, N. Y.
A. Waldman, 1317 Ave. U., Brooklyn, N. Y.
Penn Radio Service, 614 Sutter Ave., Brooklyn, N. Y.
H. W. Griffith Corp., Haddonfield, N. J.
Braddock Motor Supply Co., Braddock Ave., Braddock, Pa.
V. A. Kent, Westfield, N. Y.
Fuchs Appliance Co., 3607 Meramee St., St. Louis, Mo.
Rupert Electric Co., Rupert, Idaho.
Tooele Mercantile Co., Tooele, Utah.
Electric Wiring Co., Medford, Ore.
Waren L. Henderson, 72 S. Holden Ave., Trenton, N. J.
C. W. Epps, Mineola, Tex.
The Denton Manufacturing Co., Shelby, Miss.
Carpenter Bros., Clifton, Tex.
Smith & Tomson, Hillsboro, Tex.
Cooling Systems Ltd., 86 Liverpool St., Sydney, Australia.
Jones Electric Co., 295 Central Avenue, Dover, N. H.
Electric & Radio Supply Co., Inc., 227 Franklin St., Chicago, Ill.
August C. Hey, 3941 N. Ashland Ave., Chicago, Ill.
Lander Hardware Co., Elizabethtown, Ky.
Gem Jewelry Co., Arkadelphia, Ark.
T. G. Dial & Son, Holly Grove, Ark.
The Radio-Music Store, 841 Central Ave., Hot Springs, Ark.
Lutz & Wells, 82 Union St., Rockville, Conn.
Radio Electric Co., New Kensington, Pa.
Giesens' Inc., Radford, Va.
Taylor Bros., St. Maries, Idaho.
D. P. Maynard, Hamilton, N. Y.
Allen Electric, 7 W. Lawrence, Helena, Mont.
Vernon J. Smith Electric Shop, 112 W. Main St., Dundee, Ill.
Loughridge Service, Kentland, Ind.
Youngs Music House, 263 Ames St., Rochester, N. Y.
Newton Buchmann, 501 Queen Anne Ave., Seattle, Wash.
C. F. DeLano, Kendrick, Idaho.
Harry S. Brinton, Libby, Mont.
Generator & Starter Co. Ltd., Oshawa, Ont., Canada.
Otis Cooksey, W. Morgan St., Martinsville, Ind.
F. J. Rector & Co., N. Pendleton Ave., Pendleton, Ind.
Radio Equipment Co., Cave City, Ky.
Bryant Bros. Hardware Co., Danville, Ky.
E. E. Sterling, Mammoth Springs, Ark.
Hanford & Horton, Middletown, N. Y.
Jackson & Davis Elec. Engineering Co., 215 W. 7th Ave., Homestead, Pa.
H. M. Brown, Caledonia, N. Y.
Buhl Hardware Co., 919 Main St., Buhl, Idaho.
Parowan Auto Co., Parowan, Utah.
Clarence B. Dibble, Sidney Center, N. Y.

Brooklyn Coal Company Displays Wayne Electric Refrigerators



This display of Wayne electric refrigerators was arranged in the main show room of one of the three stores operated by the Hygrade Coal Co. of Brooklyn. A staff of 20 salesmen is on the job selling Wayne refrigerators for this concern, according to A. J. Simmons, sales manager for the electric refrigeration department of the Hygrade company.

Dealers:
Ideal Electric Shop, Wakefield, R. I.
Dils Bros & Co., Parkersburg, W. Va.
J. P. King Plumbing and Heating Co., Port Washington, Wis.
C. V. Swanson, Cannon Falls, Minn.
J. L. French, 140 Main St., Manassas, N. Y.
Fred S. Thomas, Cold Water, N. Y.
Duffy Powers Co., 50 Main St. W., Rochester, N. Y.
O. H. McNeill, 107 E. Walnut St., Herrin, Ill.
J. M. Osborn, Hartline, Wash.
Reilly's Battery Station, Moscow, Idaho.
Jas. Mitthoff, Stephentown, N. Y.
Wilson Auto Electric Service, 112th St., and Fifth Ave., Troy, N. Y.
Dow Radio Co., Harvard St., Brookline, Mass.
J. N. Adams Co., Buffalo, N. Y.
Templin Music Stores, Goshen and Mishawaka, Ind.
Dewey Peterson, Bloomington, Ind.
Kokomo Copeland Co., 602 N. Washington St., Kokomo, Ind.
Verheyden & Bere Electric Co., Green Bay, Wis.
Robert W. Flyer, Inc., 287 Front St., Hempstead, L. I.
F. V. Martin, 2933 Atlantic Ave., Atlantic City, N. J.
John J. Nickerson, Livonia, N. Y.
Charles Schmidt Hardware Co., 9622 S. Broadway, St. Louis, Mo.
Globe Scale & Fixture Co., 740 Collinsville Ave., E. St. Louis, Ill.
Lynn Brothers, Sparta, Ill.
Western Furniture Co., Salt Lake City, Utah.
Dixon-Taylor-Russell Co., Nephi, Payson, Spanish Fork, Springville, Pleasant Grove, American Fork, Heber and Provo, Utah.
Swanson & Dahl, Petersburg, Alaska.
E. Von Euen Electric Co., Polson, Mont.
L. H. Beeman, Granby, Conn.
Dunham Sales Co., New Britain, Conn.
Richard H. Tait Co., 12 Norwich St., Worcester, Mass.
F. R. Stokes & Son, 516 Mulberry St., Clyde, Ohio.
West's Electric Shop, 124 N. Main St., Hightstown, N. J.
Reliable Furniture Co., 23 Witherspoon St., Princeton, N. J.
Staatsburg Electric Shop, Staatsburg, N. Y.
Crowell Brothers, Shelburne, Nova Scotia.
Rhode Island Radio & Electric Co., 60 Weybosset St., Providence, R. I.
Peter Kastelyn, 36 E. 111th St., Chicago, Ill.
Miller Brothers Furniture Co., 4020 W. 26th St., Chicago, Ill.
Newcom Motor Co., Inc., 23 N. Genesee St., Waukegan, Ill.
McCombs Supply Co., Harlan, Ky.
Dixie Hardware Co., Middlesboro, Ky.
G. R. Wallace, Midway, Ky.
J. J. Hoffer, Emery, S. D.
Cleveland Electric Shop, Northfield, Minn.
Peter Ewald, 2999 Third Ave., Bronx, N. Y.
J. E. Todd, Fayette City, Pa.
Narrows Motor Sales Co., Narrows, Va.
L. A. Wilson, Williamsport, N. Y.
Domestic Electric Co., 908 Pine St., St. Louis, Mo.
Moore Grocery Co., San Marcos, Tex.
J. S. Flood Radio, 799 Madison Ave., Albany, N. Y.
Falls Tire Co., Great Falls, Mont.
S. Blum & Sons, 3535 Southport Ave., Chicago, Ill.
Lassers Furniture Co., Inc., 160-70 S. Schuyler St., Kankakee, Ill.
T. B. Karcher, Lombard, Ill.
Millen Hardware Co., Wilmette, Ill.
Paul Blum, 7339 Constance Ave., Chicago, Ill.
J. G. Bostrom, Wray, Colo.
Lewis Weiss, Crown Point, Ind.
The Electric Shop, Greenfield, Ind.
E. S. Root, Hagerstown, Ind.
Dale Kelley, Hillsdale, Ind.
May Company, 8th & Broadway, Los Angeles, Calif.
Brinn & Parrish, 6304 Santa Monica Bldg., Los Angeles, Calif.
Bleeker Hardware Co., 809 South LaBrea, Los Angeles, Calif.
Banning Electric Co., Banning, Calif.
L. A. Duncan, 2891 W. Pice, Los Angeles, Calif.
Elwood Gas & Appliance Co., 227 East Broadway, Glendale, Calif.
Goodell & Proud, 200 E. Central, LaHabra, Calif.
Johnson & Lynch, Corona, Calif.
J. C. McArthur, Florida St., Hemet, Calif.
Orange Hardware, Anaheim and Santa Ana, Calif.
Reed Hardware, Glendora, Calif.
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Graham Radio Co., Graham, Tex.
Kiel Electric Co., Monroe, Wis.
I. R. Johnson, William St., Albert Lea, Minn.
Ford Hardware Co., Maud, Okla.
Key Hardware Co., Wewoka, Okla.
George Neidermyer, Glassport, Pa.
A. J. Clevenger, Ontario, N. Y.
Crown Service Sta., 1700 Dewey Ave., Rochester, N. Y.
E. R. Sutter & Co., Eureka, Mo.
Quillie Merc. Co., Wells, Nev.
Edwards Furniture Co., 24 S. Main, Logan, Utah.
George Isidore, Half Moon Bay, Calif.
Mt. View Hardware, Mt. View, Calif.
E. A. Franz Co., Hood River, Ore.
Jamison Hardware Co., McMinnville, Ore.
Stevens Chevrolet Co., Grangeville, Idaho.
White Brothers, Redwood, New York.
W. C. Dorbrandt, Athens, Tex.
Ford Electric & Radio Co., Jackson, Miss.
G. Johnson, Macon, Miss.
Jarrell Motor Co., Jarrell, Tex.
Electric Refrigerator Agency, Vancouver, B. C., Canada.

Kelvinator of Canada, Ltd.

Dealers:
C. T. Oke, 40 King St. W., Oshawa, Ont.
D. G. Kirk & Sons, Antigonish, N. S.
Brittain & Hallett, Weymouth, N. S.

Servel

Distributors:
Koback's Dept. Store, 645 Broadway, Gary, Ind. (Servel)
Wright Electric Co., Valparaiso, Ind. (Servel)
Columbus Gas Co., Columbus, Nebr. (Electrolux)
Automatic Gas Refrigeration Co., 319 W. Walnut, Louisville, Ky. (Electrolux)
South Carolina Public Service Co., 233 King St., Charleston, S. C. (Electrolux)
Norfolk Gas Co., Norfolk, Nebr. (Electrolux)
Star Radio Co., 501 Main St., Johnstown, Pa. (Electrolux)
Interstate Oil Co., Sioux City, Iowa, (Electrolux)
Arkansas Gas Refrigerator Co., El Dorado, Ark. (Electrolux)
Western Utilities Stores Co., Great Bend, Ohio, LaCrosse and Holsington, Kans. (Electrolux)
Metropolitan Utilities Dist., Omaha, Nebr. (Electrolux)
St. Joseph Gas Co., St. Joseph, Mo. (Electrolux)
Virginia Hdw. & Mfg. Co. Inc., Danville, Va. (Servel-Electrolux)
Jas. S. Remick Co. Inc., 909 12th St., Sacramento, Calif. (Servel-Electrolux)

Dealers:
Stanley Furniture Co., Hobart, Okla. (Electrolux)
Lawrenceburg Gas Co., Lawrenceburg, Ind. (Electrolux)
Dressler Radio Co., Cincinnati, Ohio (Electrolux)
Joseph B. Scheve, Cheviot, Ohio (Electrolux)
Rowland Radio Sales Co., Norwood, Ohio (Electrolux)
Taylor Hardware Co., New Comerstown, Ohio (Electrolux)
Frank W. Perkins, 407 Broad St., Charleston, W. Va., (Electrolux)
R. R. Mittendorf, 1004 Gallia St., Portsmouth, Ohio (Electrolux)
H. M. Boothe & W. E. Pauley, Hamlin, W. Va. (Electrolux)
W. F. Fought, Milton, W. Va. (Electrolux)
H. T. Lawless, 187 Front St., Marietta, Ohio (Electrolux)
R. E. Hale, 620 Avery St., Parkersburg, W. Va. (Electrolux)
J. A. Zimmerman, New Martinsville, W. Va. (Electrolux)
Ed. H. Little, 26 Camayo Arcade, Ashland, Ky. (Electrolux)
Horn Electric & Plumbing Co., Newport, Ky. (Electrolux)

Sparklets

Distributors:
American Motor Equipment Co., 842 Commonwealth Ave., Boston, Mass.
Duncan & Goodell Co., Mechanic & Commercial Sts., Worcester, Mass.

Dealers:
Hieronymus Bros., Jacksonville, Ill.
Lima Kelvinator & Home Equipment Co., Lima, Ohio.
Hajoca Corp., Lansdowne, Pa.
Higgins MacRoberts Co., Whitman, Mass.
Edward A. Klein, 4735 White Plains Ave., Bronx, New York City.
P. M. Worner, Honor, Mich.
New Standard Corp., Mount Joy, Pa.
Bancroft Electric Co., 39 Pleasant St., Worcester, Mass.
Rosseau Electric Co., Worcester, Mass.
Miss A. Zavitz, 90 Merrick Road, Baldwin, N. Y.
Southwestern Ice & Cold Storage Co., 236 Second St., Yuma, Arizona.
Anthony Bros., 603 Broadway, Camden, N. J.
Macomb Copeland Co., 48 Cherry St., Mt. Clemens, Mich.
Sibley, Lindsay & Curr Co., Rochester, N. Y.
Chalmers-Kelvinator Co., Hempstead Ave., Malverne, N. Y.
Potomac Electric Power Co., 14th and C Sts., N. W., Washington, D. C.
Rendall & Greacen, 419 George St., New Brunswick, N. J.
A. H. Wherry, Jr., Chester, So. Car.
The Radio Shop, 97 Penn St., Pittsfield, Mass.
G. M. Dweley, Inc., 235 Curtis Bldg., Detroit, Mich.
Domestic Refrigerating Co., Montgomery, Ala.
J. E. Hemsted, Inc., 106 E. Forsyth St., Jacksonville, Fla.
Warren Products Co., 175-25 Jamaica Ave., Jamaica, L. I.
Superior Refrigeration Co., 118 W. Colfax Ave., Southbend, Ind.
The Ohio Edison Co., Springfield, Ohio.
Peoples Gas & Electric Co., 22 Second St., N. W., Mason City, Iowa.
Yonkers Electric Light & Power Co., 4 Irving Place, New York City.
Lowell Electric Light Co., Lowell, Mass.
Peoples Electric Supply Co., 509-15th St., Windber, Pa.
Northern States Power Co., 1600 Chestnut Ave., No., Minneapolis, Minn.
Brockton Gas Co., 54 Main St., Brockton, Mass.
Oswegatchie Light & Power Co., Gouverneur, N. Y.
So. Carolina Public Service Co., 233 King St., Charleston, S. C.
Pennsylvania Power & Light Co., 9th and Hamilton Sts., Allentown, Pa.
Central Hudson Gas & Electric Corp., 50 Market St., Poughkeepsie, N. Y.
Michigan Gas & Electric Co., Three Rivers, Mich.

To Handle Kelvinator In Lima, Ohio

The Lima Kelvinator and Home Equipment Co. has been formed in Lima, Ohio. Officers of the new concern are J. C. Bossert, Loren M. Arthur and M. B. Bossert.

Constantly Improved

—first to perfect the refrigerator with scores less parts, among the first with multiple control, silenced mechanism, freezing control, simplified commercial refrigeration, all this coupled with low freight rates and quick shipments, recommends Electro-Kolds to Pacific Coast and Western trade. Write for our catalog, Electro-Kold Corporation, Spokane, Washington.

ELECTRO-KOLD

Since 1922—The simplest electric refrigerator.

M & W CO.
1876

LACQUERS
ENAMELS

A Lacquer Finish that Has Stood the Test M & W REFRIGERATOR LACQUER ENAMELS

A Quality Reputation on these products has been established through actual large quantity production on Cabinets widely distributed throughout the world. Another complete M & W Finish including either Lacquer or Oil Primer followed by M & W Lacquer Enamel in White or Colors. We invite your correspondence regarding your particular problems.

MAAS & WALDSTEIN CO.

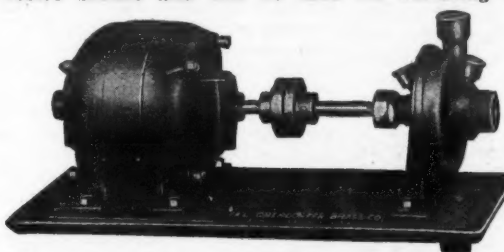
EXECUTIVE OFFICES AND PLANT, 438 RIVERSIDE AVENUE
NEWARK, N. J.

CHICAGO OFFICE
AND WAREHOUSE
1115 Washington Blvd. West

LOS ANGELES OFFICE
AND WAREHOUSE
1214 Venice Blvd., Los Angeles, Calif.

A Remarkably Efficient Pump

Oberdorfer Motor Driven Centrifugal Pumps are built to fulfill special refrigeration requirements. They are made of noncorrosive bronze and can be used for handling either calcium or sodium brine. These low priced units give splendid service and are used for circulating, water cooling and for handling refrigerants in milk cooling and similar installations.



Oberdorfer All-Bronze Centrifugal Pump No. 4G.

IMMEDIATE DELIVERIES

M. L. OBERDORFER BRASS CO.
2309 Thompson Road, Syracuse, N. Y.

The PRESIDENT

On the Boardwalk
Overlooking
the Ocean.

ATLANTIC CITY'S Finest Residential Hotel
500 Rooms with Sea Water Baths
American or European Plan
Sea Water Swimming Pool
Concert Orchestra

Also Furnished Housekeeping
Apartments of 2-3-4 rooms
Under the management of
CHARLES D. BOUGHTON



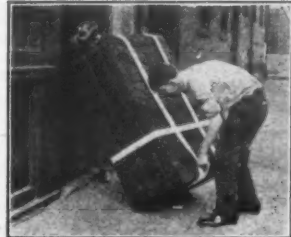
—PROTECT YOUR DELIVERIES

Lansing Refrigerator Covers are made to completely cover all exposed surfaces—giving full protection against costly damage.

Samples of materials and prices on request.

LANSING SALES CO.
170 Harrison Ave., BOSTON, MASS.

LANSING PADDED MOVING COVERS



EXTRA DRY ESOTOO

THE PUREST
SULPHUR DIOXIDE

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WE HAVE AN AGENT WITH OUR PRODUCT IN STOCK
NEAR YOU—WRITE US WHERE WE CAN SERVE YOU

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F. A. EUSTIS, Sec. - 131 State St. BOSTON - 2 Rectory St. NEW YORK